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THE IRON AGE

New York, July 8, 1926

ESTABLISHED 1855 VOL. 118, No. 2

Spheroidization and How It Occurs

Damascus Metal a Remarkable Example—Relation to Grain Growth and Grain Boundaries—An Explanation of Stead's Brittleness

BY ARCHIBALD ALLISON

THE breaking up of pearlite by annealing and the globularization of carbide have been investigated by Tchernoff, Belaiew, Stead, Howe, Desch, and others. Under a prolonged annealing, near the critical point, the laminae of carbide have a tendency to break up, and their shape alter in the ultimate erection of spheroids. In massive specimens the process is difficult to bring about, except by very long annealing at temperatures fluctuating just above and just below the critical point. This is in the absence of strain.

Damascus Swords and Spheroidization

The Damascus swords and daggers investigated by Tchernoff, and before him by General Anossoff, from 1820 to 1831, were remarkable examples of the utility and beauty produced by spheroidization of cementite. Anossoff confirmed by experiment that the old Indian steel was produced in crucibles, either direct from the ore, or by melting iron with charcoal and, after prolonged fusion, allowing the furnace to cool down, so that a very coarse crystallization of the mass was developed. The ancient artificers having, possibly, very inefficient means of heating and forging or, by experience, learning the correct temperature to avoid redissolving the cementite, produced by prolonged labor blades with great beauty of pattern, together with remarkable efficiency as weapons.

The Damascening is thus compounded of massive cementite spheroids produced by the slow cooling from fusion, together with finer spheroids from successive heatings and hammerings. Incidentally Anossoff, about 1831, examined his specimens with a microscope to determine the quality of the pattern.

As to the commencement of the divorce of pearlite, it has been suggested that the laminae are not mechanically broken by strain since, when alternate plates of lead and thin glass are arranged together, it is possible to bend the composite considerably without injury to the glass. The analogy is imperfect, however, since in the process of straining a crystal aggregate there is inter-crystalline strain as well as intra-crystalline; that is to say, there is adjustment of the external shape of crystals to accommodate the varying resistances to stress, due to different orientation.

In straining steel by wire drawing, cold rolling, or even in finishing by hot rolling below the critical point, the strain is severe by reason of its complexity. Hence it is reasonable to conclude that the spheroidization of carbide commences with mechanical rupture of the laminae, although this is difficult to show microscopically since the pearlite grains are oriented at random, with corresponding variety of resistance to stress and slip.

Coalescence of Spheroids

Once spheroidization has commenced, not only do repeated strainings and annealings continue to break up any pearlite grains which have resisted divorce, but also coalescence takes place between the spheroids, resulting in the production of a coarser size.

This coalescence is undesirable, since the larger spheroids are more difficultly soluble, in the event of heat treatment being required; and hence, to obtain a full hardening effect, a longer time of heating and higher temperature are necessary than are desirable, or even practicable, with some small articles. With a cold-worked steel, the temperature of annealing need not be so high as the critical point, and in fact a lower temperature is desirable from the point of view of avoiding coalescence of the already

THIS article represents labor and research of considerable duration and is a distinct contribution to one phase of steel production. The author is chief of the research department of the J. J. Habershon Co., Holmes Mills, Sheffield, England, an old established producer of hot and cold rolled strip and of sheet steel. He is a university trained man, all of the past 20 years having been spent in the steel business, most of it with Cammell, Laird & Co.

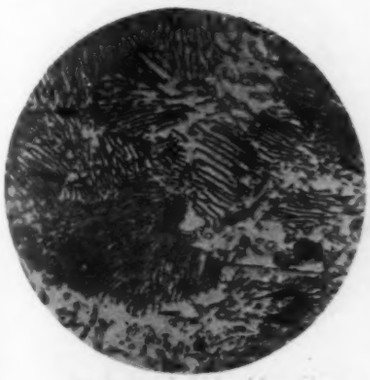

Fig. 1—500 *Diameters*

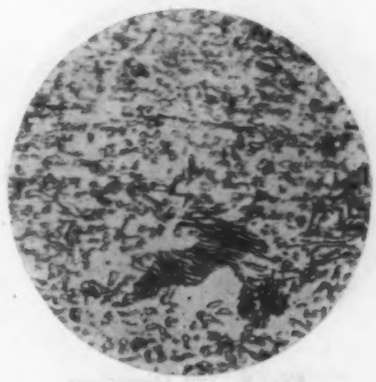

Fig. 2—500 *Diameters*

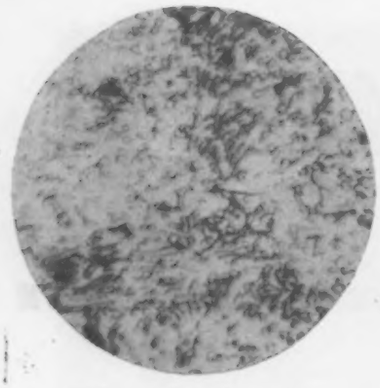

Fig. 3—500 *Diameters*

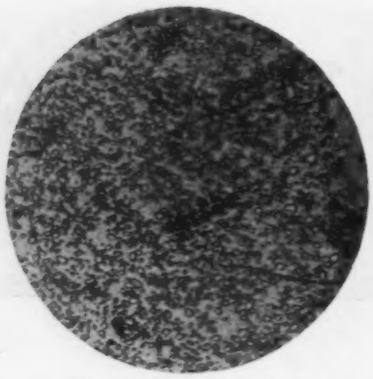

Fig. 4—500 *Diameters*

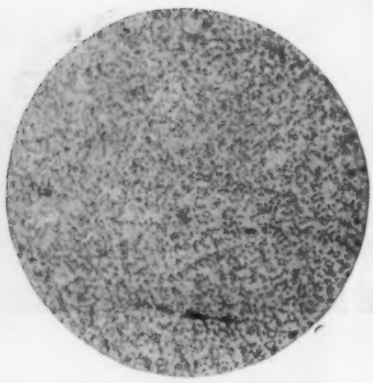

Fig. 5—500 *Diameters*

formed spheroids. A higher temperature will of course result in the reformation of pearlite, and that of large structure, resulting in very coarse spheroidization by later processes. Figs. 1 to 6 show microstructures of various phases of spheroidization in hard steel, all at 500 diameters.

There appears to be no deviation from ordinary physical laws in the process of spheroidization. Once the carbide laminae are ruptured by stress, the fragments under annealing naturally tend to round off corners, and gradually move toward a spheroidal shape, surface tension being also a factor. Probably, also, there is some effect produced by the ferrite which will now be considered.

When a very mild steel is strained slightly under oscillating stress, for example, it has been shown by Doctor Hanson that, in the crystals toward the junctions, there are dark marks produced which ultimately develop into slip bands and finally fracture. Fig. 7 shows lines produced by straining in a material already of very coarse grain size. There has been much discussion as to the visibility under the microscope of slip bands, and still more as to why, if one part of the crystal slips along a natural cleavage plane, it should still adhere to the other part of the crystal. It has, however, been shown by Doctor Desch and others that, on annealing at a low temperature, the bands resume a definitely crystalline structure of very small size and, on further annealing at a higher temperature, these small crystals possess an extraordinary capacity for growth, so that very large crystals may be produced.

Growth of Crystals

As to the mechanism of slip, there seems to be no reason to doubt that, along the gliding planes, the material actually becomes liquid momentarily, in a parallel way to oxyacetylene cutting, or electric spot welding, in which liquid metal and cold metal exist almost side by side for a short period of time. In the cold working of steel, the liquid planes are so thin that the remaining mass of relatively cold metal acts as an immediate quenching, semi-quenching or regelation. This does not mean that the resulting material of the slip band is amorphous, but microcrystalline or ultra-microcrystalline.

Naturally a highly quenched material, which has had no opportunity of attaining crystalline equilibrium, on annealing tends toward large stable crystals as far as the temperature and time of annealing permits. That crystals appear to grow at the expense of other crystals without any apparent law, since small crystals may devour large ones and vice versa, may possibly be explained in some such way as the following: The straining of the steel produces slip bands of microcrystalline material, and a distorted atomic space lattice in the remainder of the material of each crystal, that is, in the blocks which have slipped along the cleavage planes. Each crystal is then a composite of new microcrystals of undistorted lattice, together with masses of old crystals with distorted space lattice. The former have at hand, as it were, suitable material for growth.

This is quite parallel with the growth of living creatures, which, with suitable material and environment, may grow to large size. In the case under discusion the environment is provided by the raising of the temperature to the requisite point. A noteworthy characteristic of the microstructure is the production of island crystals. Figs. 11 and 12 are typical examples of a crystal within a crystal.

It is true that in some cases these may be true islands, or peaks of submerged crystals, but from the frequency of their occurrence, and the general character of grain growth, there can be little doubt that in many cases a nucleus preserves its individuality amid atomic movement which results in a completely enveloping crystal.

Stead's Brittleness

The number of slip bands, or nuclei, depends on the amount of cold work or strain, and hence, if unit mass or volume be divided into crystals growing from few nuclei, the grain size will be large; if the crystals result from many nuclei, the grain size will be small. This occurs if the temperature and time of annealing have been sufficient, since it is possible to anneal a slightly strained material at a low temperature, under 600 deg. C., without obtaining large grains while, with a severely strained material, an excessively large grain size is not produced by long annealing at 750 deg. C. from the larger number of nuclei in competition for the available material.

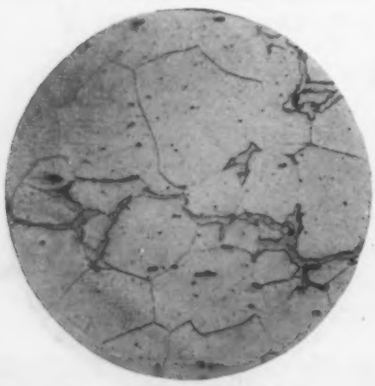

Fig. 9—300 *Diameters*

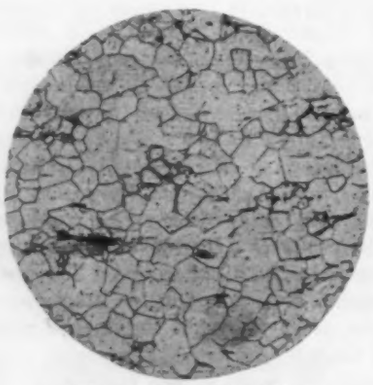

Fig. 10—100 *Diameters*

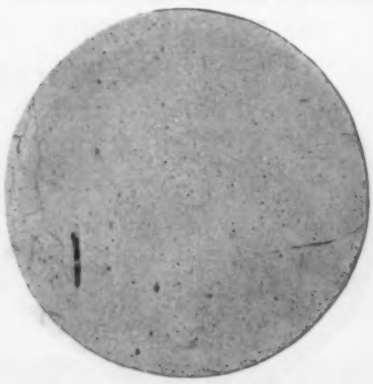

Fig. 11—100 *Diameters*

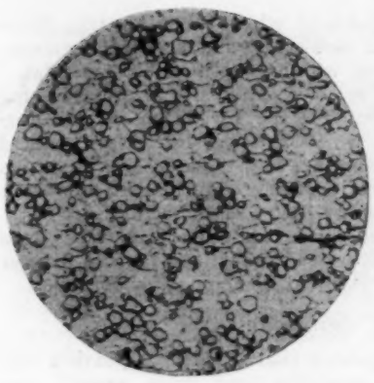

Fig. 6—500 *Diameters*

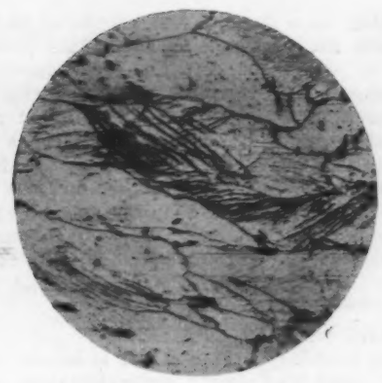

Fig. 7—100 *Diameters*

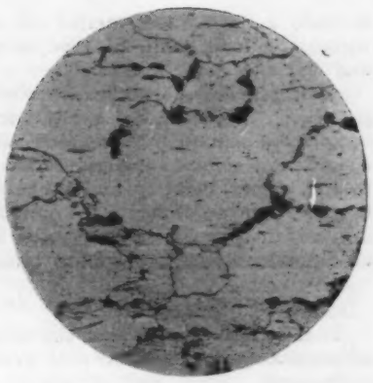

Fig. 8—100 *Diameters*

The extraordinary phenomenon known as Stead's brittleness forms the link between spheroidization of carbide and grain growth. Doctor Stead showed that mild steel plates, on annealing, sometimes developed extraordinary brittleness. With a carbon contents of 0.20 per cent or less, the plates would not stand bending and gave very little elongation. The grain size was very coarse and, if the material was slightly strained by being bent or shaped in the cold, the steel could easily be broken with a hammer, and would not bend at right angles without cracking. Figs. 7 and 8 are such examples.

Doctor Stead suggested that the material under such conditions failed along cleavage planes. This is doubtless correct, but it does not entirely account for the phenomenon. Grain growth is always accompanied by a greater or less degree of spheroidization of the carbide. The grain growth of the ferrite crystals extends to the ferrite of the pearlite, and the carbide is expelled to the crystal boundary where it is grouped, not in granules or spheroids, but in spidery or floral shapes actually dividing crystals. This form of carbide occurs usually in steels annealed after slight straining.

Figs. 9 and 10 illustrate "spidery" or "massive" cementite. With fairly severe straining the carbide is frequently in the form of granules, which may or may not be intercrystalline.

A notable exception occurs in severely worked sheets which contain segregated portions. In such steels the carbides may be intercrystalline, and abnormal grain growth may occur in patches or even on one side only. Figs. 13 and 14 illustrate patchy grain growth on one side only of a sheet.

Intercrystalline Cementite

Intercrystalline cementite must of necessity be an important contribution to mechanical weakness. Large crystals of soft material, interspaced by spidery shaped plates of intensely hard material, constitute a structure obviously unsuitable to withstand any variation of mechanical stress. Parenthetically it may be said that intercrystalline cohesion does not require the existence of intercrystalline cement, since it may well be accounted for by atoms being common to the space lattices of adjacent crystals, even of different orientation, or alternatively by interatomic force of adjacent atoms of neighboring lattices, or both these reasons.

Stead's brittleness only follows grain growth and occurs in steel of very coarse grain size. The grain growth produced by annealing after straining must have a very important effect upon the spheroidization of carbide, since the ferrite grains grow to the exclusion of the fragments of carbide which, to some extent, no doubt, assisted by the pressure of the ferrite, tend to assume the spheroidal shape of any fluid mass suspended in another medium. Low carbon steels in which this brittleness occurs are required to withstand cold deformation and still possess mechanical strength, and the phenomenon is conspicuous in these because in higher carbon steels the carbides act as mechanical obstructions to grain growth and the relative proportions of the two constituents produce a contrary mass effect.

Grain Size and Mechanical Strength

There is a further link between Stead's brittleness and the well-known relation between grain size and mechanical strength. Returning to the fatigue lines and slip bands produced in Doctor Hanson's experiments with alternating stresses, it is obvious that the stresses are more effective in a coarse grained material because they can work without interruption and without change of direction in each plane. It is notable that the lines show a tendency to converge toward the corners of the crystals and this is further evidence in support, since the convergence arises from the resistance produced by the different orientation of the adjacent crystals.

It is now agreed that some crystals, on account of their orientation slip easily and thereby divert the stress on to crystals, of which those unfavorably oriented for resistance slip. Probably the crystals, with principal axis most nearly at right angles to the direction of force, yield first and those with axis parallel to that direction yield last, but in the aggregate under stress there is an infinite series of readjustments of load. This applies equally well to static tests. The actual yield point of mild steel is a very uncertain quantity owing to the adjustments of the tensile stress following crystal movements. That is, fatigue produced in crystals favorably oriented for slip, throws the load on to other crystals successively, so that the tensile test

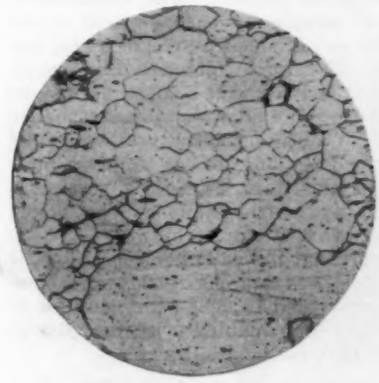

Fig. 12—100 *Diameters*

Fig. 13—300 *Diameters*

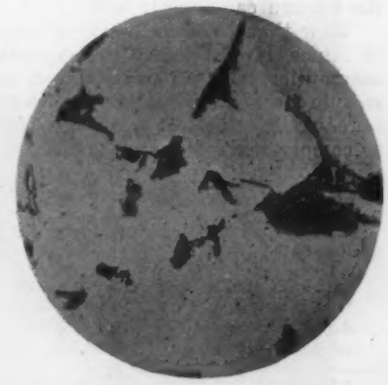

Fig. 14—300 *Diameters*

is really a fatigue test carried out rapidly by a steadily increasing load until all readjustments are overcome and the aggregate breaks.

This is quite paralleled by the later fatigue tests in which the stress is rapidly increased, in order to complete a test in a reasonable period of time. It is a matter of common experience that smaller grain size means higher tenacity and greater hardness, and attempts have been made to account for this by attributing certain properties to crystal boundaries, such as an intercrystalline amorphous cement.

Increased Resistance Is Dynamic

It is now suggested that the increased resistance to deformation, in a material with greater boundary area, is dynamic. Since each crystal is of small size, only a very small slip is possible before the stress is diverted to other crystals. Since the number of crystals is large, the number of interruptions is large; also the number of slip bands, which are themselves highly resistant to deformation, and there are much more frequent changes of orientation. The path along which the force moves is very tortuous, much more so than in an aggregate of large crystals.

In material of very large crystal size, there is the plasticity of the ferrite crystals, interrupted by the intercrystalline cementite to some extent, but more largely interfered with by variations of orientation by which blocks of crystals move in a mass, being released by the yielding of one crystal, or possibly more. The result is to produce the rough lumpy surface found in coarse grained material after mechanical test.

A further point in comparing fine grained and coarse grained material is that the slip bands in the latter are greater in the proportion of the square of the diameter of the crystals. Large mechanical interruptions in the continuity of any material are more effective in producing weakness than many small interruptions. This is well illustrated by the relative strengths of cast irons, in which large straight flakes of graphite produce weakness, and small curly flakes and spots correspond with strength of the material.

The question of relative grain size is of increasing importance on account of the revolution in manufacturing methods by which articles, formerly produced by casting and forging, are now made by cold pressing. Motor and cycle parts, formerly built up, are now made in one piece by pressing out of sheet in the cold.

For each purpose there is a suitable size of grain corresponding to the requisite ductility for the process of forming and the residual tenacity after forming.

Summary

It is hereby suggested that divorce of pearlite and spheroidization of cementite, and grain growth, are reciprocal processes; also that annealing after straining is the common cause of these phenomena, by the formation of definite crystals from slip bands, and the growth of these crystals upon the strained portion of the original crystals.

Large grain size corresponds with weak material, on account of the less frequent change of direction of the stress applied, and the strength resulting from small grain size is produced by the more numerous adjustments of the line of force.

Slight straining in coarse grained material is sufficient to cause brittleness by reason of the large area of the slip planes.

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What Coke Combustibility Means

Old and Recent Definitions Criticized—Coke's "Nature and State"—Flammability for Combustibility Suggested

BY THOMAS T. READ*

IN his interesting article on the "Combustibility of Coke" that appeared in THE IRON AGE, Feb. 18, R. H. Sweetser not only praises the work done by various investigators of the United States Bureau of Mines, but also gently chides them in the following language:

> * * * but further results should not be reported in terms that are contrary to those used in the practice of making pig iron.

The general idea of this pronouncement is perfectly sound, but to comply with it involves assuming that the terms used in the practice of making pig iron are used in a definite and accurate way that the men of the bureau can comply with.

Now that I am no longer a member of the Bureau of Mines, I want to try to demonstrate that the latter assumption is not soundly based, and that the apparently reasonable request Mr. Sweetser makes of the bureau's investigators is difficult, if not even impossible, to comply with.

Definition of Combustibility

Mr. Sweetser goes on to quote H. A. Brassert as having said in 1906:

> What principally concerns the blast furnace is the rate of progression of the combustion, which depends not so much on the chemical analysis as on the physical qualities of the coke. It is this rate of progression that we term combustibility, which is the speed at which the carbon molecules in the coke combine with oxygen under given conditions.

In considering this definition two things are evident. In the first place, Brassert was attaching a new meaning to the word. There is nothing in the definitions of combustibility given in the New Oxford, Century or International dictionaries that supports the concept that the word combustibility had ever before any idea of rate attached to it.

Until the time of Lavoisier the nature of combustion was not understood; Lavoisier demonstrated that it was simply an oxidation process. The oxidation of the carbon in a steel sample by chromic acid is not called combustion; its oxidation in a stream of oxygen is called combustion. The word combustibility means, according to all the dictionaries, that a substance can be oxidized by that variety of oxidation processes called combustion; there is no idea of relativity or rate in it at all. The New Oxford dictionary cites as an example of the correct use of the word Faraday's statement about the combustibility of the diamond, by which Faraday meant simply that it can be burned.

Admitting, however, that it was entirely permissible for Brassert to attach a new meaning to the word combustibility, since he proceeded to define his new use of it, we next notice that his definition is inconsistent with itself. He said that combustibility

> is the rate of progression of the combustion * * * * which is the speed at which the carbon

*Assistant Secretary American Institute of Mining and Metallurgical Engineers, New York.

molecules of the coke combine with oxygen under given conditions.

These two phrases do not mean the same. The speed at which carbon molecules combine with oxygen is, so far as the chemist knows, infinite. As to rate of progression of combustion let me cite another definition:

> The velocity of the combination which is produced at a given instant within a homogeneous system is determined when for this instant the nature and state of the substances forming the system are considered, the temperature to which the system is brought, and the pressure it supports is known—(Thermodynamics and Chemistry, by Dubem and Burgess, page 413).

Nature and State of the Coke

Evidently the idea which Brassert was endeavoring to make clear was that, in a homogeneous system of which coke is one of the components, the velocity of combustion will vary according to the "nature and state" of the coke, when temperature and pressure in the system are kept invariable, but using the word combustibility to express this idea imposes a difficulty of comprehension on the reader that seems to me unnecessary because, as explained above, combustibility has never been used to signify the nature and state of combustible substances, but signifies instead that they are capable of being oxidized in the way that is called combustion.

Mr. Sweetser does not overcome these difficulties in his suggested definition, which is as follows:

> The combustibility of a blast furnace coke is the *rate of complete gasification* of that particular coke in front of the tuyeres of a blast furnace under standard conditions of blast temperature and of blast volume,

for he is still trying to make combustibility signify a rate of reaction, which is not only a meaning that it never had, until the blast furnace men sought to so define it but also is, in my judgment, a meaning it can not logically have. The individual piece of coke that I can hold in my hand has a "nature and state" (which is apparently what Brassert and Sweetser mean by combustibility) that will affect its reaction velocity in combustion independent of temperature and pressure. This "nature and state" is obviously not a *rate* for it is something permanent and unalterable.

Perhaps an example will make this point clearer. Oatmeal mush can be swallowed without chewing it, dry oatmeal has to be chewed; therefore, oatmeal can be eaten faster in the form of mush than it can be eaten dry. The nature and state of the oatmeal affects the rate of eating it, but its nature and state is not a rate and cannot be defined as a rate. Any attempt to do so not only confuses the reader but also the writer of the definition.

Suppose we say "What principally concerns the man eating his breakfast is the rate of progression of the swallowing, which depends not so much on the chemical analysis as on the physical qualities of the oatmeal. It is this rate of progression that we term 'eatability,' which is the speed at which the oatmeal slips down the man's throat under given conditions." It is here evident that the terms are mixed; the "eatability" is not the rate at which the oatmeal slips down the man's throat; it is rather the nature and state of the oatmeal that, in turn, affects the rate of swallowing. The rate of swallowing might, under standard conditions, be used as an index of the nature and state, but the rate is not itself a "nature and state" and cannot logically be so defined, because it depends on other things as well as on nature and state.

Combustibility Is Flammability

My own suggestion is that we abandon the attempt to attach a new and, to me, illogical meaning to the word combustibility and use instead the word flammability, which the dictionaries define as "susceptibility of taking fire readily." I therefore would amend Mr. Sweetser's suggested definition to make it read as follows:

> The *relative* flammability of blast furnace coke is indicated by the relative rate of complete gasification of that particular coke in front of the tuyeres of a blast furnace, and can be measured by comparing it with the rate of gasification of a standard coke, both under standard conditions of blast temperature and of blast volume.

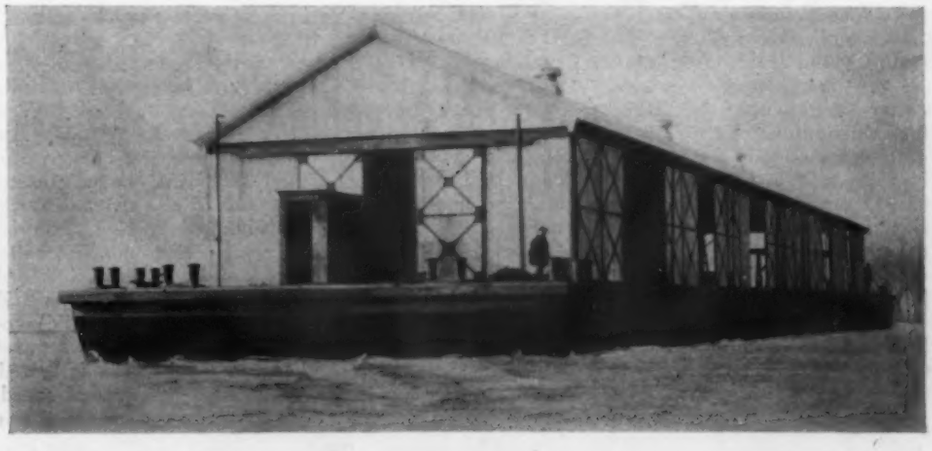
If Mr. Sweetser will accept this amendment and the blast furnace men will vote in favor of it, we can then proceed to the task of determining the relative flammability of different varieties of coke that have a different "nature and state."

All-Metal Wharf Barge

A barge with an all metal superstructure has appeared on the Mississippi river in Louisiana. It is virtually a floating iron house with iron roof, sides, downspouts, and gutters. More than 20,000 lb. of ingot iron was used in the superstructure alone, though the sheets were of Nos. 24 and 26 gage material, which is corrugated to stand hard knocks.

The cabin itself measures 200 ft. long by 32 ft. 8 in. wide. The dimensions of the barge are 230 ft. long, 40 ft. wide and 12 ft. deep.

The wharf barge was built by the Midland Barge Co., Midland, Pa., for the Bâton Rouge Transportation Co., Bâton Rouge, La. The cabin was built by the Kiefer Sheeting & Painting Co., Pittsburgh, of material supplied by the American Rolling Mill Co. of a special analysis for rust-resisting qualities.



Wharf Barge Built for the Baton Rouge, La., Transportation Co. by the Midland Barge Co., Midland, Pa. The cabin is 32 ft. 8 in. x 200 ft., on a hull 230 ft. long

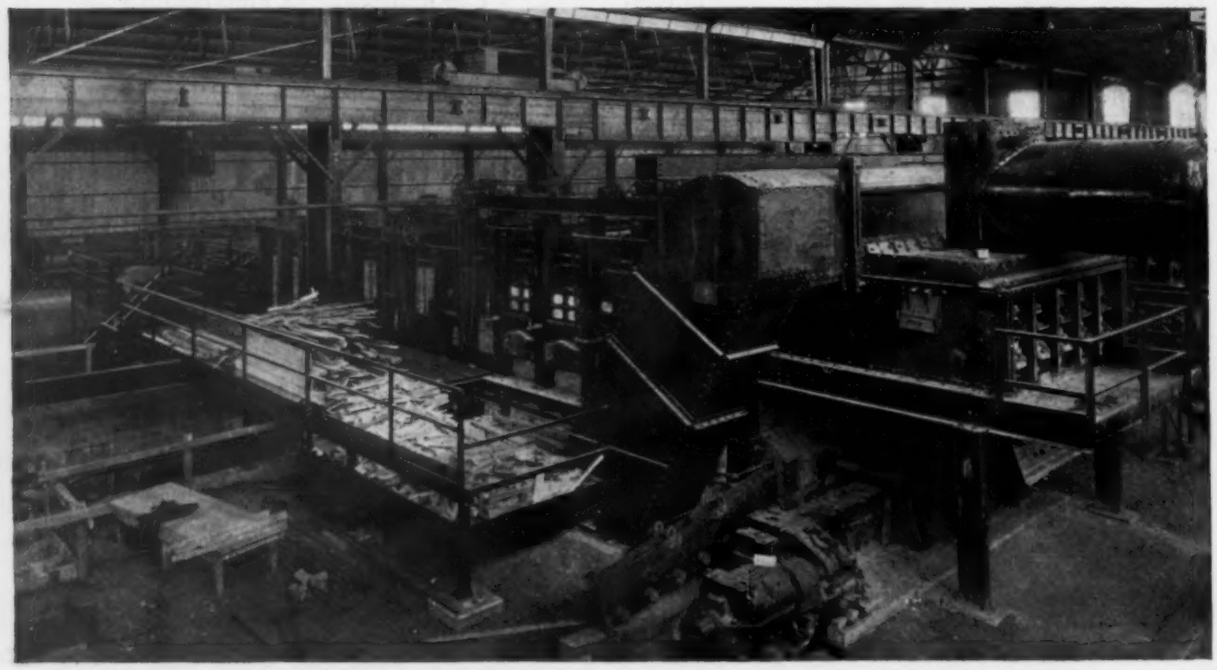
New Hot-Strip Mill in Operation

Fourteen Stands Driven by Nine Motors—101 Motors on Run-Out Table and Hot Bed—Producer Gas Used

BY ROGERS A. FISKE*

HOT-ROLLED strip is now being produced on the new 14-stand, hot-strip mill of the Acme Steel Co., Riverdale, Ill. Slabs varying in size up to 3 in. in thickness, 21 in. in width and 10 ft. long will be rolled into strips varying in width from 3½ in. to 20 in. and in all standard gages. The cold rolling department which this mill serves produces strip in widths from 7/32 in. up to 20 in. and in gages from 0.005 in. up.

Slabs are delivered by rail to the slab-storage building, 100 ft. x 240 ft., adjacent to the hot-strip mill building and in such relation to the furnaces that the Whiting 10-ton overhead electric crane can deliver slabs to the electrically-driven pushers at the charging end of the furnaces. The pushers are motor driven through gears, and the operator, with remote controls before him, stands near the charging end and between the two furnaces. Surrounding these furnaces is an unusually complete and well designed system of platforms and stairways, with flooring of subway grating made by the Irving Iron Works Co., Long Island City, N. Y. The furnaces are side by side, and slabs from either furnace may be discharged to a single line of feed rolls, on which they are conveyed to the slab shear.



Air for the Slab-Heating Furnaces Is Preheated to About 1300 Deg. Fahr. Neither forced nor induced draft fans are used

Seven stands in the roughing mill, three in the intermediate mill and four in the finishing mill constitute the 14 stands of the mill. A slab, after passing the shear, first goes through the horizontal edger, designated as stand No. 1. It then passes through two 20-in. roughing stands, through stand No. 4, a second horizontal edger, and then through No. 5 stand, a 20-in. roughing mill. Stand No. 6 is a vertical edger and the last pass of the roughing mill is a 20-in. mill designated as stand No. 7.

The intermediate mill consists of stand No. 8, a vertical edger; stand No. 9, a 16-in. mill, and stand No. 10, also a 16-in. mill. The finishing mill consists of stands Nos. 11, 12, 13 and 14, which are all 16-in. Space has been provided for two additional stands. The pinions and roll housings were all furnished by E. W. Bliss Co., Brooklyn, N. Y.

Vertical Edger Is Driven by a Separate Motor

Stands Nos. 1, 2, 3, 4, 5 and 7, that is, the roughing train, are all driven by means of a 1500-hp., 2300-volt, 3-phase, 60-cycle induction motor geared to a long line shaft which extends parallel to the mill. No. 6 and No. 8, vertical edgers, are separately driven by means of 600-volt, 100-hp., variable-speed, d.c. motors. No. 9 stand is driven through gears by a 1500-hp., 600-volt, d.c. motor. Stands Nos. 10 to 14 are driven by individual 1800-hp., 600-volt, d.c. motors; No. 10 is driven through gears, and Nos. 11 to 14 are direct-connected to the motors. All reduction gears used in connection with the drive of this mill were furnished by the Farrel Foundry & Machine Co., Buffalo.

Tables and the hot beds used in conjunction with this mill were furnished by the Treadwell Engineering Co., Easton, Pa. The runout rollers extending from stand 14 to the end of the hot bed are 97 in number, each separately driven by a ½-hp. direct-connected Westinghouse motor, 220-volts, 3-phase, 25-cycle, and 340 r.p.m. Ten of these rollers are mounted between No. 14 stand and the hot bed, and the remaining 87 are required to cover the full length of the hot bed. That these rollers may be synchronized with the speed of the No. 14 stand, a separate generator (furnishing power to these rolls) is belted directly to the drive of that stand. The normal speed of this generator would provide electric current at 25 cycles. Any variation in

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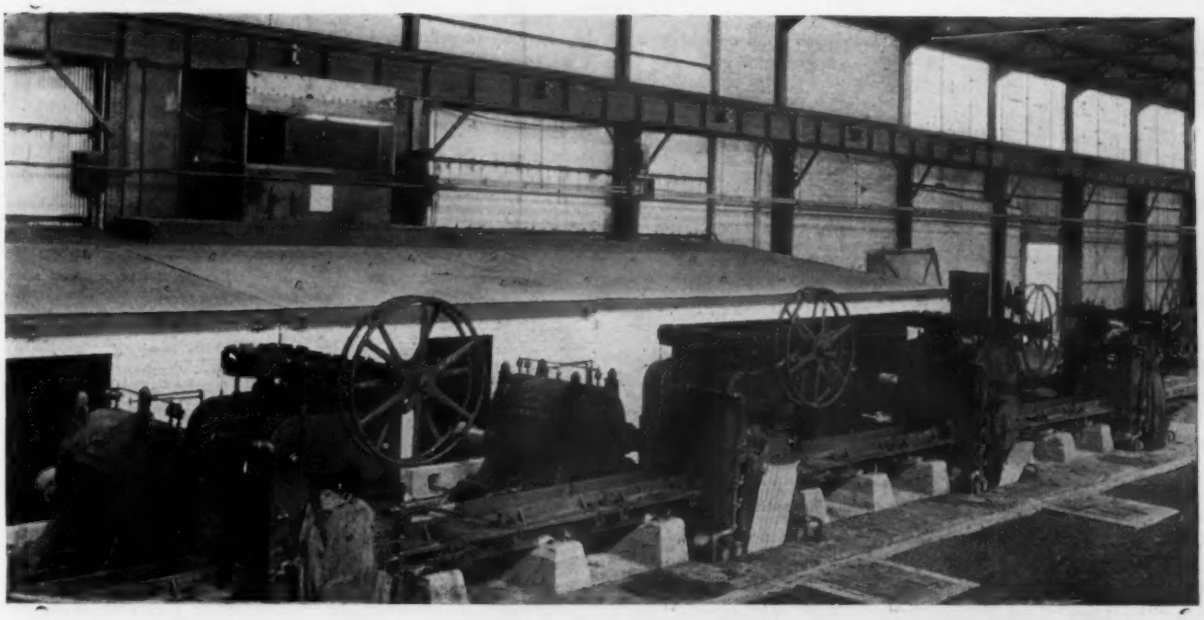

(At Top) The Main Operator's Pulpit Is Located in the Wall Which Separates the Mill Room from the Motor Room

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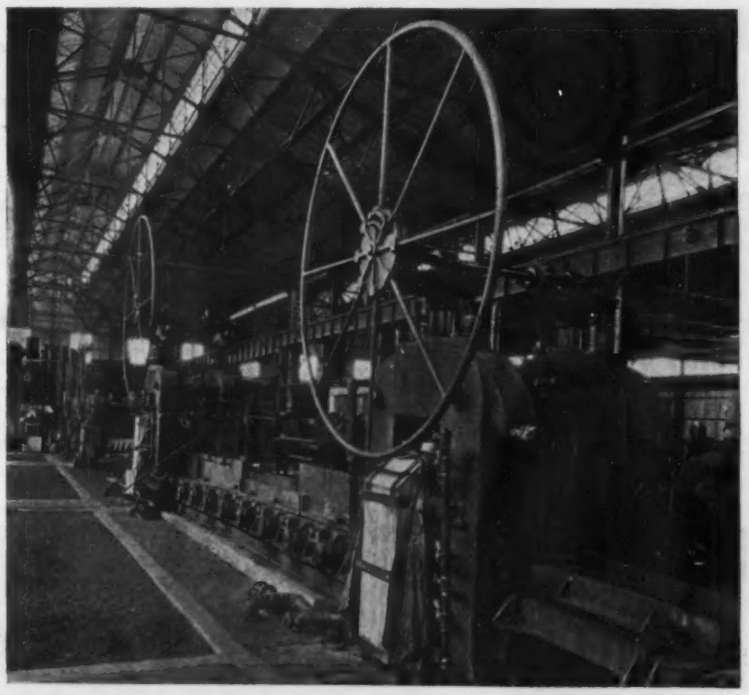
(At Right) Stands Nos. 1, 2, 3, 4, 5 and 7 in the Roughing Train Are Gear Driven by Means of a 1500-hp. Motor



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(Below) An Unusual Hot-Bed Layout. The 97 run-out rollers are each separately driven by a direct-connected motor

the speed of the mill will be followed immediately by a corresponding change in the speed of the rollers.

The hot bed, approximately 50 ft. wide by 250 ft. long, is equipped with transfer bars which move the finished product to either side, to the electrically operated shuffle bars which place the product within reach of the transfer rollers. The drives for these rollers are grouped, so that only two motors are required on each side of the hot bed. At the end of each run of transfer rollers is a belt-driven Treadwell Engineering Co. gage shear. Immediately beyond each gage shear is a piler table, and finally an E. W. Bliss Co. coiler.

Located at the side of the building between the intermediate and finishing mills is a motor-driven, jaw-type scrap shear. The drive and rear end of the shear extend into a lean-to, but the cutting jaws project into the main bay, so that the overhead electric traveling cranes can handle material to and from the shear.

Furnaces Are of Recuperative Type

Two slab-heating furnaces, of the recuperative type, were designed and built by the Chapman Stein Furnace Co., Mount Vernon, Ohio. Each furnace is designed for a capacity of 15 tons per hour and is sufficiently wide to take slabs 11 ft. long. The recuperator for preheating the air is below the furnace and is so designed that air enters at the bottom beneath the charging end of the furnace, passes upward through the recuperator and then forward to the firing end, where it rises through the brick-lined, sheet-metal ducts at each side and enters an air box located above the gas box.

Producer gas enters at the discharge end of the furnace. The split-flame method of firing is used, which causes the products of combustion to heat the slabs both above and below and in this manner pass to the charging end of the furnace and then downward to the recuperator. After the waste gas makes three horizontal passes, the length of the recuperator, it traverses an underground flue to an 80-ft. steel stack lined to the top with fire brick.

Air ports in the furnace are located directly above the gas ports and no mechanical power is required, either for the induction of air into the furnace or for the removal of the waste products of combustion. The gas pressure at the furnace is 0.20 in. of water and the pressure of the air at the furnace ports, which is under the natural head created by the difference in temperature between the heated air and that of the atmosphere, is 0.15 in. of water. The air used for combustion is heated in the recuperator to within 400 or 450 deg. Fahr. of the temperature of the waste gas in the downtake of the furnace. This latter temperature will normally be about 1700 to 1800 deg. Fahr., indicating that the temperature of the air for combustion will be some 1300 deg. Fahr.

Each furnace has four skid pipes made of 2½ in. double-extra-heavy seamless tubing. On top of each pipe is welded a ¾-in. bead. It has been found that this bead on the top of the skid pipe is helpful in eliminating cold spots on the slabs, which are present when the slabs rest directly on the pipe. The skids run the length of the furnace and a slag or cinder pit is provided beneath the pipes at the discharge end. The bottom of this pit is covered with coke breeze upon which the cinder and slag drop. Doors on each side of the furnace permit easy removal of the cinder. This feature eliminates Sunday labor for cutting down the hearth, which is necessary when a brick-soaking hearth is employed instead of skid pipes.

Cooling water for the skid pipe is pumped from a nearby stream to an overhead stand pipe, from which it flows by gravity to the furnaces. After passing through the skid pipes the water drains to three scale pits, located beneath the hot-strip mill. There it acts as a means of conveying scale from the mills to scale pits located outside the main building. The scale pit opposite the furnace run-out table is approximately 43 ft. long by 10 ft. wide; the two others are each about 23 ft. long by 10 ft. wide. These are open concrete pits, cleaned periodically by means of a bucket suspended from the boom of a locomotive crane. One of the smaller scale pits takes care of the accumulation at stands Nos. 1, 2, 3, 4 and 5; the other small pit takes care of stands Nos. 6, 7, 8, 9 and 10.

Producer gas is made in a separate structure to the west of the hot-strip mill building. Two No. 10 Wellman-Seaver-Morgan Co. full-automatic mechanical gas producers, each having a gasifying capacity of 4000 lb. of coal per hour, are used. The coal burned during the first few weeks of operation of this plant was from the East Kentucky fields. Coal, delivered to the plant

At the End of Each Line of Transfer Rollers Are a Gage Shear, a Piler Table and a Coiler

No. 6 Stand, Which Is a Vertical Edger, Is Separately Driven

in standard railroad cars, is unloaded into a 12-ft. x 12-ft. steel track hopper, the mouth of which is raised but a few inches above the yard level. The coal passes from the hopper to a 30-in. apron conveyor which elevates it to the hopper of a double-roll crusher, belt-driven from an electric motor. Crushed coal falls down a chute to the boot of a bucket-type elevator which unloads into two unlined steel hoppers located over the gas producers. The entire coal-conveying system and the crusher were furnished by the Link-Belt Co., 300 West Pershing Road, Chicago.

Gas leaves the top of each producer and passes through a steel soot collector. Gas gathered from these two collectors passes through a third collector before entering the main which leads to the heating furnaces. All three collectors are located between the gas-producer building and the hot-strip mill building, and the gas main leaves the last collector at such a height that it pitches downward at about 25 deg. to enter the hot-strip mill building. Inside the building the main runs horizontally, with its center about 7 ft. above the floor. It is constructed with three dust legs ahead of the point where the first furnace connection is made. The main flue, 6 ft. in diameter, is lined on the inside with 2½ in. of insulating material and 4½ in of fire brick.

All Electric Power Is Purchased

Electric current for this plant, purchased from the Commonwealth Edison Co., Chicago, enters at 12,000 volts, 3-phase and 60-cycles. It is stepped down to 2300 volts through a set of single-phase transformers; another set of transformers steps down such current as is required at 220 volts. A transformer on the lighting circuit provides current at 110 volts. The main motor room is built adjacent to the main mill building and is opposite to the intermediate and finishing mills. In it are located the central control switchboard, two motor-generator sets and an exciter set. Space is provided for two additional motor-generator sets. Each such set consists of a 2850-hp., 2200-volt, 3-phase, 60-cycle motor mounted on a common shaft with two 1000-kw., 600-volt, d.c. generators.

The exciter unit consists of a 940-hp., 2200-volt, 3-phase, 60-cycle motor mounted on a common shaft with two 300-kw., 250-volt, d.c. generators and a 50-kw., 250-volt, d.c. exciter. All the motor and control equipment used throughout this mill was furnished by the Westinghouse Electric & Mfg. Co. The transformers are located in a separate room, adjacent to the motor room and the hot-strip mill building. They are mounted on platforms placed sufficiently high above the floor so that a transfer table, operating on rails, can move the transformers from that room to the mill building, where they can be handled by the overhead electric crane.

The main control pulpit is mounted above the floor level and in the wall which separates the hot-strip mill building from the motor room. The operator in this control room has at his command all of the main switches and also the controls of all of the mill stands except the edgers, which are controlled individually from the operating floor. A separate motor-control stand handles the hot bed and another, opposite the intermediate and finishing stands, provides for the manipulation of the looping aprons, which are operated by means of compressed air.

The motors which drive the mill are housed in brick inclosures covered with removable roofs, so that the motors may be readily accessible to the overhead electric cranes. Two motor-driven, Buffalo Forge Co. blowers, each rated at 50,000 cu. ft. per min., are mounted in a separate room at the end of the motor room, to provide air for the mill motors. The air is passed through filters made by the Reed Air Filter Co., 215 Central Avenue, Louisville.

Building Is 70 x 2000 Ft.

The new hot-strip mill is located in an extension to a mill building which houses the stock room, the pickling vats, and the annealing ovens of the cold-rolling mill. The building as it now stands is over 2000 ft. long. Its width is 70 ft., and the crane runway throughout its length is standard, so that the four cranes can be used in any part of the building. The new cranes, installed primarily for the hot-strip mills, are a 25-ton crane with a 5-ton auxiliary hook and a 10-ton crane, both made by the Whiting Corporation. The old cranes which operate on this runway are of 35 and 10-ton capacity.

The building is of the steel-frame, mill type, the roof and siding being of corrugated metal. The monitor is fitted throughout its length with ventilated steel sash. Fabrication and erection of the building were carried out by McClintic-Marshall Co., Pittsburgh.

With the installation of this mill it was found necessary to add to the capacity of the boiler house. Accordingly two 500-hp. Union Iron Works (Erie, Pa.) boilers are being erected. These will operate at 160 lb. pressure, without superheat. Chain grate stokers were furnished by the Illinois Stoker Co., Alton, Ill., and the forced draft fans by the Buffalo Forge Co. The new reinforced concrete stack which will serve these boilers is 10 ft. inside diameter by 237 ft. high. It was constructed by J. V. Boland Construction Co., St. Louis. The water-treating plant for the boilers was by the Graver Corporation, East Chicago, Ind.

What British Foundries are Doing

Developments in Gray Iron Covered at the Annual Meeting of Institute—New Foundry Equipment Exhibited

(Special Correspondence)

LONDON, ENGLAND, June 25.—The International Foundry Trades Exhibition, the fourth of its kind to be held in Great Britain, was held in London last week in order to coincide with the annual convention of the Institute of British Foundrymen. Cooperating with the organizers are the National Physical Laboratory, the research department of Woolwich Arsenal, the universities of Birmingham, Sheffield and Glasgow, and other research bodies, who between them have arranged an important group of scientific research exhibits.

Some of the most important and interesting papers at the sessions of the I. B. F. as well as a brief account of leading features of the exhibition are found in the following account.

Papers on Cast Iron and Foundry Sand

THE annual conference of the Institute of British Foundrymen makes no pretensions to being an international one, yet it was attended by a large number of overseas visitors, and was characterized by the excellence of the foreign exchange papers.

Quantity Output of Quality

The most important paper presented was the American Foundrymen's Association paper entitled "Quality in Quantities," by Arnold Lenz of the Saginaw Products Co., Saginaw, Mich. This paper opened up the question whether it is possible to produce, under mass production methods, an article comparable with that made by hand-molding methods. It showed in the clearest possible way that, while quantity production methods demand less skill from the craftsman, they enlist the closer attention of the management, and that this intense application of ingenuity by the management results in the production of really high-grade castings. A production foundry, employing about 2500 men, may not employ over 10 full-fledged molders and coremakers. The burden of supplying the necessary knowledge of the details involved in the manufacturing of a great tonnage of intricate castings falls, therefore, entirely on the management. For this reason, to operate successfully a production foundry with the most efficient equipment to maintain it, to design the necessary special appliances and to organize its force in such a way that the product will flow through the plant in a continuous uninterrupted manner, is best accomplished if the executives are advanced from the ranks by merited promotion. Uniformity of mold and core shape, control of the physical and chemical properties of the metal, sand and other raw materials assume greatly enhanced importance under quantity production methods.

Improvements in Cast Iron

High-tensile cast iron was dealt with in a paper by Louis Piedboeuf of the Belgian Foundrymen's Association, who emphasized the advantage of low-carbon contents. The lower the carbon content, the wider the zone of pearlitic structure. There is thus greater certainty of getting the pearlitic structure without the risk of encroaching on adjacent zones. By keeping at an equal distance from the cementite and ferrite zones, there is a greater chance of getting the pearlitic structure without heating the mold. In the higher carbon machinery cast irons, a considerable increase in the graphite lamellæ will always be found toward the center even where the diameters are smaller. With low-carbon and high-silicon pearlitic cast irons, it is possible to obtain an identical texture in the thin and the thick parts of the same casting. Diminution in the size of the graphite lamellæ, which is also important, has been effected by treating the metal in an oil or electric furnace, and, according to Piwowarski's researches, it is principally by superheating the liquid iron that the finely distributed graphite is formed. But it would be no use trying to reduce gaps caused by faulty distribution of the graphite lamellæ, if other discontinuities were allowed to persist in the shape of blow holes, segregations, or internal stresses. In a specimen cast iron a tensile strength of 15.7 to 17.6 tons per sq. in. was obtained (in spite of a phosphorus content of 0.8 per cent) by a purifying treatment carried out in the fire-hearth by alkaline substances.

Foundry Sands

R. Lemoine, on behalf of the French Foundrymen's Associates, dealt with the question of molding sands, and he showed quite clearly that some types of wasters can be anticipated and prevented by the common sense application of sand control. The latter amounts to adapting the composition of the mixtures and their preparation. The determination of the equilibrium factors should be carried out in many foundries, even in those which insist that they are satisfied with their molding sands, but which, periodically and because wasters increase, reject a portion of their old sands to be distributed in new material. General control of sands amounts to assuring constancy of permeability and cohesion, by controlling the composition of the mixture, and the author shows that apparatus for measuring these in the cold state, when employed according to certain methods, may be of great service in the foundry.

Cast Iron for Electrical Machines

Although cast steel has almost entirely replaced cast iron for electrical machinery, J. H. Partridge, of Birmingham, as the result of a highly interesting research carried out under the direction of Prof. Thomas Turner, definitely disproves the old idea that cast iron does not have any useful magnetic properties, and he predicts for this material a promising future in the electrical industry. He finds that the highest magnetic induction and permeability are obtained with cast iron which has been annealed. In the extreme case the magnetic induction was increased 70 per cent and the maximum permeability was increased ten-fold on annealing. When high permeability is required, the graphite should be in the form of temper carbon. In the cast state, silicon decreases the magnetic induction, but its presence may be advantageous in alloys which have to work at low flux densities. Manganese, nickel and chromium are prejudicial to high magnetic induction. In the annealed condition aluminum, in amounts up to 1 per cent, decreases the magnetic induction, but above that and up to 3 per cent it causes a huge increase in the induction and permeability. An easily machinable non-magnetic cast iron could be made by having nickel and manganese present in such propor-

tions that the combined effect of these two elements on the carbon is negligible. Sufficient silicon would then be added to precipitate just sufficient graphite to give the required strength, machining properties, surface, etc.

The author shows that it is possible to produce cast iron with a hysteresis loss equal to that of soft iron, certainly less than that of wrought iron or mild steel. This class of cast iron should enable cast iron frames to be used in the electrical industry. The relatively low induction and permeability compared with black heart malleable iron is a great disadvantage, but when cast iron is malleableized in order to produce high induction and high permeability, the electrical resistance is greatly reduced, being only some three times the resistance of soft iron. However, the author doubts whether it would be economical to produce a malleable cast iron frame for an electric alternator.

Some British Molding and Other Machines

THE commercial exhibits were in every way worthy of the non-commercial exhibits and cover the whole range of foundry work. Various types of molding machines formed the largest individual exhibit, but there were, in addition, representative examples of riddling machines, sand mixers, conveyors and pattern-making machinery. Finished castings and raw materials were also well represented, together with cupolas, brass-furnaces and miscellaneous equipment.

A Jar Ram Molding Machine

Foremost among the exhibits of recent design was the jar ram molding machine shown by the Britannia Foundry Co., Coventry, in which the jolting, squeezing and lifting operations are all performed by compressed air. The air enters through a pipe at the base of the machine and is operated by the knee, which is pressed against a flat lever. After passing through a valve, the air is carried through a pipe to a port in the wall of the upper chamber and then through a corresponding port in the jolting piston to the underside of the piston. On the latter rising, the inlet port is covered, and when the piston has traveled a short distance, an exhaust port on the other side of the piston registers with one of the three corresponding ports in the cylinder wall.

A horizontal hand-lever operates the pattern-drawing mechanism and controls the squeezing and pneumatic vibrator mechanism. Air is admitted through the pattern-lift control valve to the top of a closed vessel containing oil, which is forced out by the air and passes to a valve in the base of the lower chamber in the main cylinder. The pressure of the oil holds the valve closed, but the oil passes through holes in the valve head and forces up the pattern-drawing piston. This is connected to an outer sleeve, which surrounds the main cylinder, by means of a pin passing through a pair of slots in the cylinder wall, so that when the piston rises it carries the sleeve with it. The corner plates are bolted to the sleeve, and carry the four vertical rods which serve to lift the stripper plate. On the downward stroke, the oil opens the valve in the base of the cylinder, the return motion being therefore more rapid than the lift. The machine table is 2 ft. 4 in. long by 1 ft. 9 in. wide, the depth of ram is 7 in. and the height of lift is 6 in. The pressure on the mold at 80 lb. per sq. in. is 4 tons, and the quantity of free air required is 8 cu. ft. per min.

A machine of the electrically-operated jar ram type was shown by the Pneulac Machine Co., Birmingham. This will ram any box from 100 lb. to 12 cwt., and every machine is tested before shipment with a 50 per cent overload. The table is 24 in. long by 20 in. wide, and the depth of the pattern draw is 10 in. Power consumption is about ½ kwhr. with a load of 8 cwt.

A Hand-Operated Ram Machine

Another machine shown by the Pneulac company is of the type in which the ram is operated by hand, and has been designed to meet the demand for a simple and inexpensive machine, capable of dealing with a wide variety of work. It consists of a cylindrical stand mounted on a base plate. The plunger carrying the pattern table moves vertically in the stand, and is raised or lowered by turning a hand lever which operates a link motion connected with the plunger, and arranged so that, when the table reaches the top position, it is automatically fixed. The molding box is supported in position on the two brackets at the ends of cross arms. The brackets are adjustable both horizontally and vertically, and the machine will take a box up to 30 in. wide, the depth of pattern being 9 in.

A foundry sand-preparing machine shown by Ketin & Thiriart of Liège, Belgium, is notable chiefly for the fact that on one base there are combined the functions of a sifter, a mixer, a mill and a disintegrator. The mesh of the sifter is sufficiently fine to keep back any ordinary pieces of scrap iron or foreign matter, but in some instances it is equipped with magnetic bars to insure that no iron at all is passed on. The whole machine is driven by an electric motor which is of 8 hp. in the case of a set capable of delivering 3 tons of sand per hour.

Another machine for the treatment of used sand was exhibited by the Rapid Magnetting Machine Co., Ltd., Birmingham. In this machine the magnetic separator, which is used to extract any scrap iron that may be in the sand, is of the shield type.

New Cutting-Off Machine

Some interesting specimens of work carried out by a new cutting-off machine were shown by the Selson Engineering Co., London. It is intended for cutting off risers and similar work in the foundry and depends for its action on the heating effect of a rapidly rotating disk, in much the same manner as do the cutting-off machines used in rolling mills. This is said to be the first occasion that the principle has been applied to cutting cold iron castings. It has the great merit that hard spots in the casting or sand cores are cut through as rapidly as the metal itself. It is claimed that the machine will cut through an iron casting 6 in. in diameter in about 160 sec. It is driven by a 60-hp. motor.

A rather unusual form of hand-operated jolt-molding machine was that placed on exhibit by the Denbigh Engineering Co. of Tipton. In this machine the table is guided vertically by a freely sliding stem and the weight of the table and mold are counterbalanced by a set of coiled springs in compression. In order to adjust the compression of the springs to meet different weights of mold, the springs are mounted on hydraulic rams, and the oil under these rams can be put under more or less pressure by means of a separate ram that can be screwed down into a connecting barrel. By these means the springs are so adjusted that the table and filled molding box are floating freely. Then a hand lever connected with a toothed quadrant and a rack on the guiding stem is used to bounce the table up and down. When the necessary knack has been attained, a violent jar can be given to the mold as the lower end of the stem bumps down onto the base-plate. In the case of the smaller sizes of machine, five or six jolts given in this way are ample to consolidate an ordinary mold, but the extent of the jolting depends on experience.

Cupola With Unique Tuyeres

A cupola, shown by the International Foundry Equipment Co. of Birmingham, is of the Rein type, and is characterized by the fact that the tuyeres are of comparatively small bore, while they are directed downward toward the center of the hearth. In this way, it is claimed, the blast is made to issue from the tuyeres at a very high velocity, so that it penetrates right into the mass of the charge, the carbon monoxide generated is burned very rapidly and a high temperature is attained. These cupolas are fitted with a special slag collector and a separate receiver for the molten metal, which is heated by gases drawn off from the top of the cupola.

Explain Design of Hypoid Gears

New Tooth Shapes and Methods of Production, Developed by Gleason Works, Outlined at Automotive Meeting—Practical Advantages Cited

HYPOID gears are tapered gears with offset axes. In general, they look like spiral bevel gears, which they will in many cases replace. The tooth action combines the rolling action of spiral bevel gears with a percentage of endwise sliding. Both in design and production, hypoid gears have always presented difficulties, and it is stated that up to the present time no gears of this type, with mathematically correct forms of teeth adapted for successful commercial production, have been known.

The chief advantages of the hypoid gears, the characteristics of which are outlined below, are noiseless operation, increased load-carrying capacity, the possibility of high reduction and low numbers of teeth, long life and high efficiency. These advantages are said to have been demonstrated in severe tests of these gears in rear axles of motor cars.

Interesting data on the design and manufacture of these Gleason hypoid gears were given by Arthur L. Stewart and Ernest Wildhaber of the Gleason Works, Rochester, in a paper presented at the summer meeting of the Society of Automotive Engineers, held at French Lick Springs, Ind., June 1-4. Part of Messrs. Stewart and Wildhaber's paper is printed below, the remainder of the paper, which treats of the manufacture of these gears being planned for publication in a forthcoming issue of THE IRON AGE.

Offset of Pinion Axis from Axis of Gear a Striking Characteristic

A PAIR of hypoid gears, having 13 teeth in the pinion and 64 teeth in the gear, is shown in Fig. 1 and for comparison a pair of spiral bevel gears with the same numbers of teeth and the same diameter (12.8 in.) of the gear is shown in Fig. 2.

The most striking difference between the two pairs is the offset of the pinion axis from the axis of the gear, on the hypoid pair. Another marked difference is the increased size of the hypoid pinion as compared with the bevel pinion. Furthermore, it is to be noted that the tooth inclination on the hypoid gear, or its spiral angle, is small, while the spiral angle of the hypoid pinion is as large as or larger than the spiral angle of the bevel pinion. All of these differences have an influence on the performance and the characteristics of hypoid gears, as outlined below.

Names prominently connected with prior developments of hypoid gears in the last decade are those of H. D. Williams, G. M. Bartlett, R. M. Uhlmann, Reginald Trautschold and Nicola Trbojevich.

The new developments made at the Gleason Works comprise new tooth shapes for hypoid gears as well as new methods of production, and are covered by a series of pending patents. The tooth shape is derived from surfaces of revolution and permits the use of the usual type of rotary cutters for generating the teeth.

Two different types of tooth shape and two corresponding methods of production have been developed. The earlier method consists in forming the gears without generation. A tooth space of the gear is then the exact complement or counterpart of the cutting surface of the tool. According to a general law of gearing, the tooth surfaces of one member of any pair of gears may be assumed at will, and the tooth surfaces of the other member are then determined or generated to suit the tooth surfaces of the first member. This is done by setting a cutter on a generating machine in such a way that it covers and represents a tooth side of the hypoid gear, and by providing the same relative motion between the cutter and the pinion blank which would exist when the pinion meshes with its mating gear.

The hypoid non-generated gears can be cut on the machines now used for roughing spiral bevel gears, but, to obtain the quality and accuracy required for finished gears, machines of higher grade than the gear roughers would be required. A later method permits cutting the gears on the known standard generators, exactly like spiral bevel gears. The pinions are cut in either case on a machine which differs from the standard generators by permitting additional adjustments. In the latter case, the generating roll is affected, as if the pinion would roll and slide on a crown gear, while axis is offset from the axis of the pinion.

Offset Varies With Diameter and Ratio

The axis of the pinion is offset from the axis of the gear by an amount which varies with the diameter and with the ratio. Standard amounts of offset of 1½ in., 2 in., 2½ in., 3 in. and 3½ in. are in use.

The direction of offset determines the hand of the spiral. In rear-axle design a pinion below center will have a left-hand spiral, while a pinion above center will have a right-hand spiral. The position below center is preferable for two reasons. First, the axial thrust resulting on the pinion on forward drive is directed away from the gear, and heavy loads tend to move the pinion out of mesh rather than draw it in.

Second, the contact between mating tooth surfaces is more intimate on the drive side. This quality will be further explained in a later section. It is more pronounced on ratios such as used on pleasure cars than on the larger ratios used on trucks.

Objections to the above center position of the pinion, as far as end thrust is concerned, can be entirely elimi-

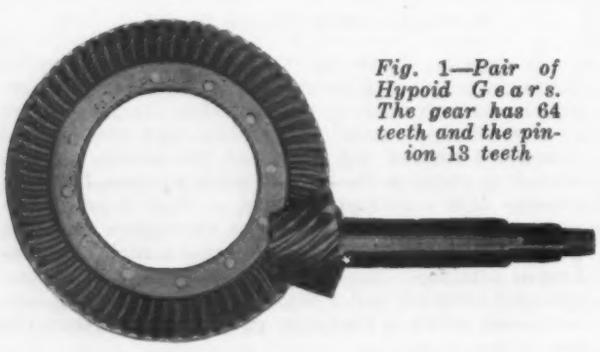


Fig. 1—Pair of Hypoid Gears. The gear has 64 teeth and the pinion 13 teeth

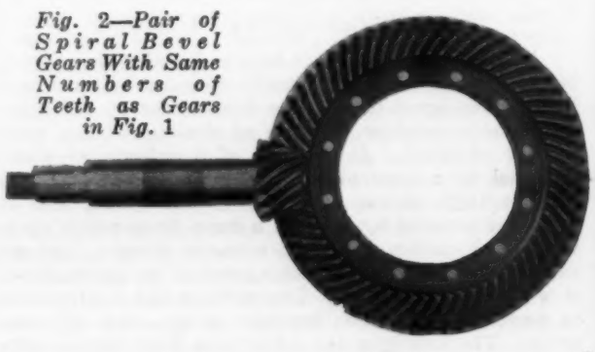


Fig. 2—Pair of Spiral Bevel Gears With Same Numbers of Teeth as Gears in Fig. 1

nated by making the bearing and housing arrangements sufficiently rigid to prevent the pinion from wedging into the gear.

Pitch Lines Subject to Restrictions

The offset of the axes is the cause of a certain amount of endwise sliding in the teeth. The teeth of hypoid gears should, therefore, extend lengthwise along such lines as will permit this sliding. Pitch lines of hypoid gears, therefore, are subject to restrictions which do not exist on bevel gears.

As an illustration, we will consider the mesh between a crown gear and an offset pinion, which is a special case of hypoid gearing.

Referring to Fig. 3, *a* and *b* are what might be called a pitch plane of a crown gear and a conical pitch

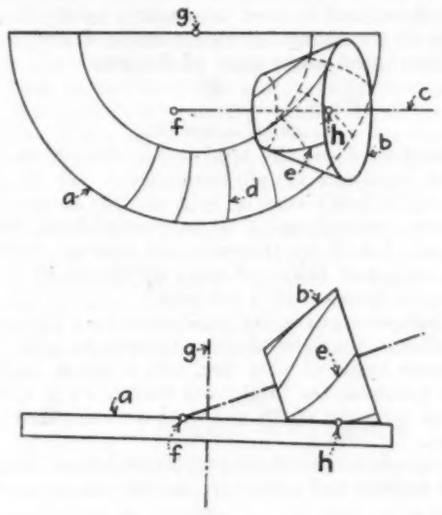


FIG. 3

surface of a pinion. The two pitch surfaces contact in a line *c*; *d* and *e* are mating pitch lines which contact with each other in changing points of line *c*, the contact line between the two pitch surfaces, which may be called line of action.

Evidently the action along line *c* is not changed, whether the conical surface *b* is considered, or whether the action of the pitch lines is analyzed in the development of the conical surface to the plane *a* of the crown gear. The developed pinion surface then rotates about apex *f* of the pinion, while the crown gear continues to turn on its axis *g*. This method of analysis is convenient, because it reduces the problem of conjugate pitch lines to the known problem of conjugate tooth profiles. Fig. 4 indicates the crown gear and the developed pinion surface. Considering an average point *h* on line of action *c*, the normal line *i* at this point with respect to two contacting pitch lines *d* and *e* should pass through the point *j*. This point is what would be called the pitch point in ordinary gearing, namely the contact point between two circles *k*, *l*, which roll upon each other without sliding, when the two bodies are turned at a constant ratio.

If the ratio between the crown gear and the developed pinion surface is assumed, point *j* is readily determined, and the normal *i* is the connecting line *h*-*j*. Conversely the normal *i* at point *h* may be assumed and pitch point *j* determined as the intersection point between normal *i* and the line *m* which connects the center *f* and *g*.

Another point of mesh on the line of action is *n*. The normal *o* to the contacting pitch lines at *n* necessarily must pass again through point *j*, inasmuch as in gears running on parallel axes *f*, *g*, the profile normal at any point of contact along the line of action *c* always passes through the pitch point. The motion of a normal itself, from position *i* to position *o*, can, therefore, be considered as a motion in which one endpoint of this normal moves along line *c*, and where the normal may slide along its own direction through a fixed point *j*. The instantaneous motion of normal *i* can be considered as an infinitesimal rotation about an instantaneous center *p*.

The latter naturally must be on a line *q* which is perpendicular to the motion at point *h* of the normal; that is to say perpendicular to line *c*. Moreover, it must be on a line *r*, which is perpendicular to the motion of the normal at *j*, in its own direction.

The center of curvature *t* of the pitch lines naturally moves about center *g*. Inasmuch as it can also be considered moving about instantaneous center *p*, it can be situated only in the connecting line *u* of instantaneous center *p* and center *g* of the crown gear; otherwise the direction of motion about center *g* and the direction of motion about center *p* could not coincide; that is, one motion would exclude the other.

The same considerations can be applied to the developed pitch surface of the pinion. The center of curvature *v* of the pitch line of the pinion is determined by connecting instantaneous center *p* with the apex *f* of the pinion by line *w*. The intersection point *v* of this line with the normal *i* is the center of curvature in the pinion.

Conversely apex *f* of the pinion could be determined, for instance, from the known radius of curvature of pitch lines *d*; that is, from the known location of center *t*. To this end, line *q* and line *u* are drawn. Then intersection point *p* is projected to normal *i*, as pitch point *j*. Apex *f* is found by drawing line *m*.

If the pinion apex is located on a perpendicular through *g* to line of action *c*, that is at *f'*, so that line *g*-*f'* is perpendicular to *c*, the above case coincides with the case previously treated by Nicola Trbojevich in analyzing the mesh between the pitch lines of a hob thread and the pitch lines of a crown gear.

Having thus determined the interrelation between mating pitch lines of a pinion and of a crown gear, the next step is to apply this knowledge to a pair consisting of a pinion and a tapered gear. If the gear is non-generated and the pinion is generated to match the gear, the same relations between mating pitch lines may be used as determined above for a pinion and an offset crown gear. The crown gear is then considered

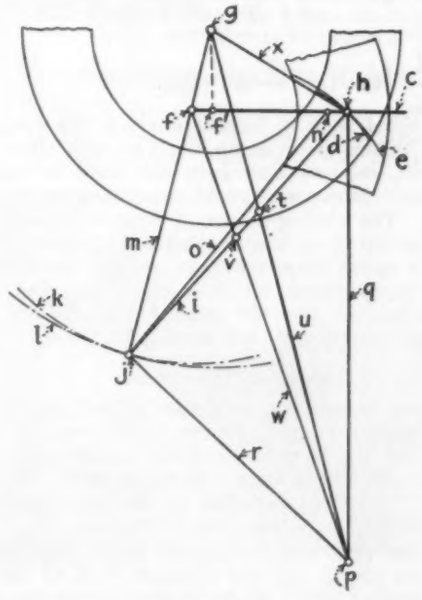


FIG. 4

the development of the gear. In Fig. 4, point *g* is the apex of the gear as well as the center of the crown gear, and line *x* is the projected axis of the gear. No error whatsoever is introduced hereby. If, however, both gear and pinion are generated, it is necessary to determine the pitch lines more accurately.

Sliding Action Makes for Quiet Operation

We will now consider lengthwise sliding at point *h*. Fig. 5 shows in a much enlarged scale the area of Fig. 4 around point *h*. *A* and *B* are the contacting tangents at point *h*. During a small motion of the gear and

pinion, the pitch line of the gear, shown as a straight line in this scale, moves in the direction *C* of the gear periphery; that is, in a direction perpendicular to line *x*. Point *h* of the gear then assumes a position *D*. The pitch line of the pinion moves in the direction of the periphery of the pinion; that is, in direction *E* perpendicular to *c*. Point *h* of the pinion has then arrived at a new position *F*. Evidently, the distance of the points *D* and *F* from one another is the amount of lengthwise sliding.

The rate of sliding can be expressed in percentage of the peripheral motion. This will, however, result in two different values for gear and pinion, inasmuch as corresponding peripheral motions *C* and *E* are different.

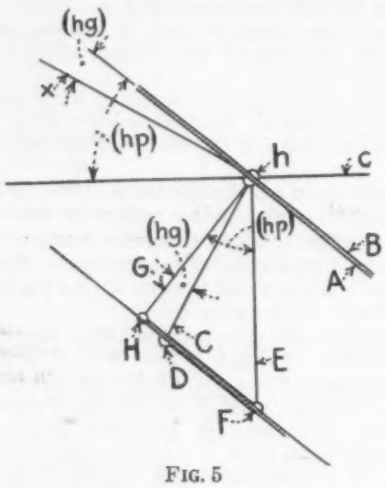


FIG. 5

It is, therefore, preferable to express the rate of sliding as a percentage of normal motion *G*; that is, of the displacement of tangents *A* and *B* in normal direction.

Let (*hp*) and (*hg*) be the spiral angles of pinion and gear, as indicated in Fig. 5. Moreover, *S* = sliding motion: *M* = normal motion. In Fig. 5, *S* equals distance *D-F*, *M* equals distance *h-H*.

S = distance *F-H* minus distance *D-H*.

$$S = M \tan (hp) - M \tan (hg).$$

$$\frac{S}{M} = \tan (hp) - \tan (hg).$$

It is noted that in hypoid gearing the peripheral motions *C-E* are at an acute angle to each other. For this reason, endwise sliding in the teeth is comparatively small. Moreover hypoid gears have a very high efficiency. The sliding action of hypoid gears is sufficient, in addition to the overlapping feature already existing in spiral bevel gears, to produce the degree of quietness in operation, which is an outstanding factor in hypoid gears. For the same reason, hypoid gears can be lapped very well and rapidly.

Ratio of Diameters

It is well known that in a pair of helical gears set at right angles, or in a worm and wheel, the pitch diameters do not have to be in the exact ratio of the respective numbers of teeth. In consequence, the circular pitch is generally different on the two members of a pair, and only the normal pitch is equal.

The same holds true for hypoid gears. The circular pitch of the pinion and the circular pitch of the gear are proportional to the corresponding peripheral movements *E* and *C*, Fig. 5. Their ratio evidently equals $\frac{\cos (hg)}{\cos (hp)}$, the inverse ratio of the cosines of their spiral angles. The hypoid member with the larger spiral angle contains the larger circular pitch. The pitch diameters themselves are proportional to the circular pitch and to the number of teeth. The spiral angle (*hp*) of hypoid pinions is being made 35 or 40 deg., depending on the tooth number in the pinion, while the spiral angle of the gear is being kept around 5 to 15 deg.

In consequence, the average pitch diameter of a hypoid pinion is increased over the average pitch diameter of a corresponding bevel pinion by 20 to 30 per cent, the gear diameter being the same. This naturally increases the strength of the hypoid pinion. Moreover, it is possible to effect large ratios with hypoid gears difficult to obtain with the spiral bevel gears, on account of prohibitively small pinion diameters.

A larger percentage of diameter increase than given above may be obtained by increasing the spiral angle of the pinion. At a 10 to 1 ratio, a hypoid pinion of 1.75 in. pitch diameter may be made to mesh with a gear of 10 in. pitch diameter, while a corresponding bevel pinion would have a pitch diameter of only 1 in.

Computing Tooth Loads

In computing the tooth loads of a pair of hypoid gears, the circumferential or tangential tooth load *P* of the gear at the center of the face may be determined from the known torque, and the pressure or load normal to the tooth surface is then determined by dividing by the cosine of the normal pressure angle *Z* and by the cosine of the spiral angle (*hg*) of the gear.

$$P_n = \frac{P}{\cos Z \times \cos (hg)}$$

This amount P_n is the total tooth load, or in other words the resultant of all components. It is noted that this total tooth load is only slightly larger than the effective circumferential or tangential tooth load *P* of the gear, for if we introduce as average amounts $Z = 17\frac{1}{2}$ deg. and (*hg*) = 8 deg., we obtain $P_n = 1.06\ P$; that is, an increase of 6 per cent.

In spiral bevel gears the total tooth load P_n is considerably larger than the effective tangential tooth load. If a pressure angle of $17\frac{1}{2}$ deg. and a spiral angle of 35 deg. is assumed, the total tooth load is $P_n = 1.28\ P$; that is, an increase of 28 per cent as compared with 6 per cent.

The analysis of the tooth profiles of hypoid pairs is somewhat tedious and cannot be carried out in a single

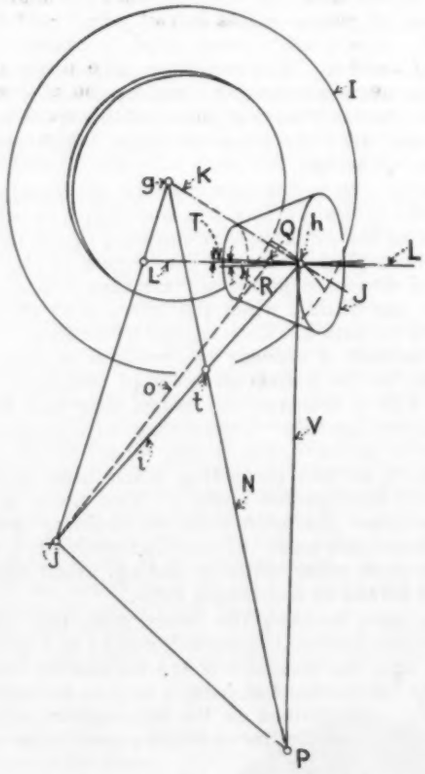


FIG. 6

plane. All hypoid pinions have the feature in common that the tooth profile of one side is more curved than the tooth profile of a corresponding bevel pinion, and that the tooth profile of the other side is less curved or flatter than the profile of a corresponding bevel pinion.

Taking the average of opposite tooth profiles, it may be stated that on hypoid-gear pairs in general the tooth profiles are similar to those of spiral bevel gears.

Opposite tooth profiles of hypoid pinions are, however, differently curved. The concave tooth side of a hypoid pinion contains a flatter profile than the convex tooth side. Partly on account of this difference in curvature, the different pressure angles of 17½ and 20 deg. are being used on the drive side and the reverse side respectively; that is, on the concave and the convex sides of the pinion teeth.

Comparison of Surface Stresses

The surface of stresses of contacting teeth—that is, the stresses of the tooth surfaces along the lines of contact in the moment of contact—are very important quantities, inasmuch as they are the decisive factor on life and wear of the gears. As is well known at present, wear of properly lubricated surfaces is practically zero at various rates of sliding, as long as the surface stresses are kept below a certain limit, which depends on the material used.

Surface stresses may be computed with the Hertz formulas, which are widely used in computing the stresses in ball bearings and in roller bearings.

We will first compare helical teeth and straight teeth. When calculating the surface stresses in helical gears and in straight spur gears with the Hertz formulas, and considering the total length of the line of contact on the various teeth in simultaneous contact, it is found that helical teeth and straight teeth are practically equivalent with respect to surface capacity; for, although the tooth contact is more intimate in helical gearing, the depth of the helical teeth is smaller, being in a constant proportion to the normal pitch, and the normal or total tooth load is larger on helical teeth for the same torque transmitted. The result can be directly applied to spiral bevel gears and straight bevel gears.

Considering hypoid gears, the intimacy of tooth contact is substantially the same as in spiral bevel gears, when taking the average of opposite tooth sides of hypoid gears. But, comparing pairs of equal diameter of the gears, the total tooth load on hypoid gears is considerably smaller than on spiral bevel gears. Moreover, the tooth height, being at a constant proportion to the normal pitch, is larger. These two factors are the cause that hypoid gears are able to carry a considerably larger load under equal surface stresses, as compared with spiral bevel gears or straight tooth bevel gears.

The figured loads are at a proportion of $\left(\frac{\cos(hg)}{\cos(hp)}\right)^3$

This proportion is given below for three cases, namely, for spiral angles (hp) at the pinion of 35 deg., 40 deg., 45 deg., and corresponding spiral angles (hg) at the gear of 5 deg., 10 deg., 15 deg. The proportion is 1.48, 1.66 and 1.87 in the three cases. Hypoid gears have, theoretically, a surface capacity increased by 48, 66 and 87 per cent over the surface capacity of spiral bevel gears or straight bevel gears, at equal diameter of the gear. These figures refer to the average surface capacity of opposite tooth sides. The surface capacity of either side is somewhat different. Usually the drive side contains the larger surface capacity; that is, a capacity still larger than given above.

(To be concluded)

To Test Rail Joints

WASHINGTON, July 2.—The Bureau of Standards, in cooperation with the American Electrical Railway Association, is working on methods of improving the strength of various types of rail joints used for street electric railways. A special type of machine has been devised for testing such joints. The process involves the placing of the welded rail joint on a large square block of metal supported by springs. A 400-lb. hammer is dropped on the joint several times a minute, thus stimulating the pounding action of car wheels going over the joined track.

Device for Using Foundry Core Paste

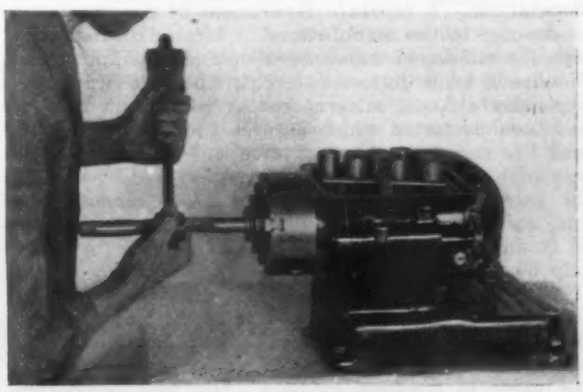
A device for applying core paste in the foundry is being put out by G. H. Bowers, 36 Letchworth Street, Buffalo. This consists of a cylinder with plunger and air connection by means of which the paste is forced through a length of hose and applied from a nozzle at the end of the hose. This nozzle is under control.

Much time is claimed to be saved by the use of this method, as compared with the hand method, of applying paste, and savings in core paste itself, also, are claimed. Any kind of core paste can be used. A light or heavy layer can be spread, according to the air pressure and size of tip used, and the layer can be spread smoothly. The machine can be used in the core room or on the molding floor. It is connected to the compressed air system, to provide the necessary impetus back of the hose.

By Varying the Air Pressure the Operator Can Obtain Any Desired Thickness of Paste Joint

Motor-Driven Reaming Machine

A compact bench type motor-driven reaming machine is being put out by the Van Norman Machine Tool Co., Springfield, Mass., to meet requirements of automotive service and repair shops. The motor-driven chuck holds reamer shanks from ¼ to 1½ in. in diameter, the chuck spindles carrying a worm wheel, which, with the worm, run in a bath of oil. The worm is driven by a gear on the motor shaft.



Motor Reamer for Repair Shops

Civil Service examination for associate ordnance engineer, with entrance salary $3,000, is announced by the United States Civil Service Commission, Washington. Examination is competitive, and full information and application blanks may be obtained from the Commission in Washington or at the Post Office or Custom House in any city.

STEEL MEN TELL OF LOSSES

Testimony at Federal Trade Commission Hearing Reveals Unprofitable Operations

More testimony revealing losses of some of the smaller steel companies in the years since the war was given at the hearing last week conducted at the Federal Building, New York, by the Federal Trade Commission in the Bethlehem-Lackawanna-Midvale merger case.

Officers of the Alan Wood Iron & Steel Co. and the Penn Seaboard Steel Corporation, both of Philadelphia, and the Lukens Steel Co., Coatesville, Pa., stated that their companies had suffered substantial losses in the past several years. In the previous week similar testimony had been given by Robert H. Irons, president Central Iron & Steel Co., Harrisburg, Pa., and by Paul King, general manager of sales, Worth Steel Co., Claymont, Del., respecting those companies.

Charles O. Hadly, vice-president in charge of sales, Alan Wood Iron & Steel Co., said that his company had lost considerable money since the war. J. B. Warren, president Penn Seaboard Steel Corporation, and Frank H. Gordon, vice-president Lukens Steel Co., gave like testimony, but no figures were introduced.

Other witnesses were examined by counsel for the Federal Trade Commission in its effort to show that the merging of the Lackawanna, Midvale and Cambria steel companies, with the Bethlehem Steel Corporation, had tended to restrict competition in the steel trade of the East. On Friday, Col. Henry P. Bope, formerly vice-president in charge of sales of the Carnegie Steel Co., gave a history of the steel business during his long connection with it. He went into details as to the origin of the Pittsburgh basing plan of quoting steel products, and told of the formation of the beam, plate, bar and rail pools and of the conditions which brought about their dissolution.

C. H. McGrath, purchasing agent, American Brake Shoe & Foundry Co., New York, gave details of the ferromanganese selling campaign of the Bethlehem Steel Corporation in 1925 whereby it sold ferromanganese at $115 with a $10 rebate, afterward reducing the price to $105, with a rebate of $10 from that price, and then later made its price $95 with a $6 rebate. George A. Crocker, of Rogers, Brown & Crocker Brothers, Inc., told of conditions surrounding the importation of manganese ore.

The hearing will be resumed in New York on July 12.

New Company to Make Steel Pipe of Large Sizes

The Superior Steel Pipe Co., recently incorporated under the laws of Delaware with a capitalization of $300,000, with offices in Farmers Bank Building, Pittsburgh, has acquired the works of the former Memphis Steel Construction Co., Broad Street and Huff Avenue, South Greensburg, Pa., which will be thoroughly remodeled and equipped with new machinery. Contracts for additional buildings are under negotiation. The company will manufacture steel plate products of all kinds, such as steel tanks, stacks and breechings, kettles, ladles, stand pipes, and will also be equipped to make riveted or electric welded steel pipe 24-in. diameter and larger.

The company will feature metal-lined pipe, tanks and other products, the lining being of zinc, tin, lead, copper and aluminum. This lining will be done by a patented spray process, which has been used extensively in Europe for a number of years, and which has attracted wide attention from scientific and engineering associations. A separate department of the works will be devoted to the manufacture of large diameter steel pipe for municipal water supplies and other purposes. The use of large diameter steel pipe has grown rapidly, especially since a mineral rubber asphaltum coating has been perfected which assures the steel pipe of a long life under the most adverse soil conditions. The new pipe works of the company, it is stated, will be the only plant in this country that can manufacture and vertically dip large diameter steel pipe up to 40 ft. in length, the present commercial length being only 30 ft.

Charles V. Witt, president of the new company, is a mechanical engineer, a graduate of the University of Dresden, Germany. He spent some time abroad on underground piping system for transmission of steam, and came to America in 1901. His first connection here was with the Carnegie Steel Co. From 1902 until 1906 he was with the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and during the latter part of this period he had full charge of all matters coming under direction of the engineer of works department. For the past 20 years, most of that time as vice-president and sales manager, he has been associated with James McNeil & Brother Co., Pittsburgh, which makes the same products as his new company.

L. R. Foust, vice-president in charge of operations, is a graduate of the Carnegie Institute of Technology, College of Engineering. After several years' operating experience with one of Pittsburgh's large steel companies, he was employed by the Bell Telephone Co., of Pennsylvania, in construction work. Resigning to enter the service in the World War, he did active duty overseas, and upon his return entered the employ of the Jones & Laughlin Steel Corporation, in charge of a group of bar mills at its Southside plant. Later he took charge of the shops of James McNeil & Brother Co., Pittsburgh.

William B. Way, manager of sales, for a number of years was Pittsburgh district sales manager of a large valve manufacturer, and for seven years was secretary and treasurer of the Natural Gas Association of America.

William H. Barr Heads New Brass Foundry Company

William H. Barr, for many years president National Founders' Association, is the head and principal organizer of William H. Barr, Inc., which will engage in the production of brass and bronze castings of every kind for the machinery trade. A foundry building at 27 Carolina Street, Buffalo, has been acquired, having about 20,000 sq. ft. of floor space and a molding space of 120 ft. square. Installation of equipment is now going on and the plant will be ready for operation about Aug. 1. Melting will be done in Monarch-Rockwell low pressure, oil-fired furnaces, in addition to oil-fired put furnaces for special output. The equipment of molding machinery, sand blast equipment, cranes, etc., is of the latest design, selected with a view to manufacturing castings at lowest possible costs.

Steel Works' Employment Falling Off

Workers in 211 iron and steel plants in May are given by the United States Bureau of Labor Statistics as 288,746, a reduction of 1.3 per cent from the April total of 292,646. A greater decline took place in the amount of the pay roll, the May total for one week having been $8,760,756, compared with $9,027,093 for one week in April. As this reduction was 3 per cent, it follows that the average pay envelope was about 1.7 per cent lighter.

Union Iron Molders Wages in Cincinnati

The new wage scale of $7.50 a day for union iron molders in Cincinnati, as announced in last week's issue of THE IRON AGE, page 11, will not become effective until Sept. 1. In the meantime the men will receive $7.37½ daily, which represents an advance of 37½c. a day over the amount paid previous to June 1.

GERMAN STEEL EXPORTS GAIN

Ahead of 1925 Average—United States Takes Over Half of Pig Iron Exported

WASHINGTON, July 6.—More than 50 per cent of the April pig iron exports from Germany went to the United States, according to a report received by the Department of Commerce from Trade Commissioner Theodore Pilger, Berlin. Other large consumers, ranking far behind the United States, however, were Sweden, the Saar District, Great Britain, Belgium, and Switzerland, in the order named.

Total iron and steel exports from Germany in April amounted to 408,402 metric tons, a decrease of 10,000 net tons when compared with exports during March. The total is still far above January or February and also greatly exceeds the monthly average of 1925. The decrease in April is mostly due to smaller exports of pig iron, rails and tubes. Fewer foreign shipments were also made in the group covering cast iron pipe, wire and nails.

Exports were larger in all other groups, notably bar iron and the heavier gages of sheets and plates. April imports into Germany totaled only 83,071 tons, compared with the monthly average of 120,000 tons in 1925. During the first four months of the present year German exports of iron and steel exceeded 1,516,000 tons, which equals 50 per cent of the exports during the entire calendar year of 1925. Total imports for the January-April period amounted to 288,000 tons, and the report says it seems evident that imports in 1926 will remain well below the 1924 and 1925 levels.

Semi-Finished Steel Exports Gain

Scrap imports were stable, whereas exports dropped off slightly, although they were still well above the 1925 monthly average. Exports were largest for the account of Italian and Polish Upper Silesian smelters. Exports of ingots, blooms, slabs, and billets increased again in April over March, but were offset by rapidly growing imports from Luxemburg and the Saar District. In spite of a slight increase of net exports the balance of trade in this line so far in 1926 is highly favorable for the German industry. Net exports of roughly 60,000 tons compared with a total net export trade of 70,000 to 80,000 tons in 1925 show the remarkable increase in competitive capacity of German producers.

Rails dropped off, with 40,000 tons exported in April against the peak of 55,000 tons in March. Exports of bar iron rose from an average of 63,000 tons in January and February to 77,000 tons in March and 93,000 tons in April, bringing them far above the averages in the last years.

Girders also increased their favorable export average, although imports from the Saar District are growing. The best customers for German girders were Argentina and the Netherlands. Exports of hoops have been very steady in the first four months of 1926 with a monthly average of 10,500 tons. Great Britain was Germany's best customer and larger shipments went to the Netherlands, Japan, the United States, Sweden, Russia, British India, and Argentina.

Increase in Plates and Sheets

Plates and sheets showed a striking increase, jumping from 39,000 tons in March to 45,000 tons in April. This gain was mostly due to heavy plates over 5 mm. thick, of which the Netherlands and Great Britain took the largest share. The trade in medium sheets remained stable, and shipments abroad of fine sheets in general increased slightly. The latter items were shipped mostly to Russia, Switzerland, Japan, and the Netherlands.

German Locomotive Works to Be Moved to Russia

WASHINGTON, July 2.—The Supreme Economic Council of the Ukraine has voted to purchase in Germany the Rheinmetall Locomotive Works, which will be moved to Lugansk in the Ukraine, according to advices from Kharkov to the Russian Information Bureau here. The new plant has a capacity of 500 locomotives a year. The price, which is estimated at 45 per cent of present cost of construction, is 7,500,000 marks, and a five-year credit has been granted.

Soviet Russia Offers Concessions to Foreign Capital

WASHINGTON, July 6.—New regulations adopted by the Soviet Government whereby concessions for construction work of all kinds may be obtained by foreign capital, are explained in a statement by Joffe, associated with Trotzky in the chairmanship of the concessions committee. The Russian Information Bureau here says the construction concessions constitute a new departure in Soviet policy.

According to Joffe, foreigners may obtain independent concessions in association with some Soviet institution, either a Government organization or one of the trusts or syndicates. In either case the concessionary has the right to participate in bids for contracts on an equality with native building organizations; he may import duty-free machinery, tools and equipment necessary to his work; he may build all kinds of subsidiary factories and workshops; he may import from abroad all construction materials lacking in Russia and may bring in highly skilled workers, technical personnel, etc. In regard to taxes and assessments he is on an equality with Government organizations operating on a commercial basis.

In housing construction the concessionary may run the buildings commercially with a free hand as to rents and housing area. He may exploit a certain area of the buildings as restaurants, stores and offices.

Joffe revealed for the first time that the concessions committee has under consideration a number of major applications from foreigners. These include a concession for the exploitation of the oil fields of Emba, one for mining iron in the basin of Krivoi Rog, and several for the construction of railroads, two of them on a very large scale. The nationality of the applicants was not announced.

Immigration Quotas Stand

WASHINGTON, July 6.—Announcement was made last week by the Department of State that there would be no change in the immigration quotas for the fiscal year beginning July 1, 1926. Consequently, there will be no presidential proclamation. The present annual quotas of the more important countries from which immigrants to the United States are received follow:

Australia, 121; Austria, 785; Czechoslovakia, 3073; Danzig, Free City, 228; Denmark, 2789; Finland, 471; France 3954; Germany, 51,227; Great Britain and Northern Ireland, 34,007; Greece, 100; Hungary, 473; Irish Free State, 28,556; Italy, 3845; Latvia, 142; Lithuania, 344; Luxemburg, 100; Netherlands, 1648; New Zealand, 100; Norway, 6453; Russia, European and Asiatic, 2248; Sweden, 9561; Switzerland, 2081.

Shipping Board Exhibits for Sesquicentennial

WASHINGTON, July 6.—The 20-ft. steel model of the Leviathan, together with a model of a typical Shipping Board cargo vessel, was loaded on a truck at the Smithsonian Institution on July 1, and sent to Philadelphia to become part of the Shipping Board's exhibit. The model of the Leviathan was built in Germany and was seized by the United States Government when it took over all German tonnage in American ports at the time America entered the World War. Another distinctive feature of the board's exhibit is an aluminum relief map of the world which is 40 x 15 ft. and which shows all the steamship trade routes.

ACCIDENT PREVENTION

Great Progress Made by Steel Corporation—Heavily Reduced Rate of Injury

Twenty years of organized accident prevention in the plants of the United States Steel Corporation has saved 46,000 men from death or serious injury, has averted accidents which would have disabled 322,000 other workmen, and has resulted in a large saving of money, it is shown in the 1926 report of the Steel Corporation's bureau of safety, sanitation and welfare.

The report shows that the corporation has spent $158,000,000 for safety, sanitation and welfare in the last 14 years, the largest item being $45,600,000 for the relief of injured employees and of the families of employees killed. From 1912 to 1926 the corporation spent $31,700,000 for sanitation, $28,000,000 for playgrounds, schools, clubs, gardens, visiting nurses and similar activities, $15,700,000 for accident prevention, $13,000,000 in pensions, and $22,500,000 for the employees' stock subscription plan.

Hand Labor Responsible for Large Proportion of the Accidents

Analyzing the causes of 306,000 accidents in the operations of the corporation over a long period, Charles L. Close, manager of the Bureau of Safety, Sanitation and Welfare, reports that hot metal, flue dust or flame—hazards distinctive in the steel industry—were responsible for less than 4.5 per cent of the total and that only 4.9 per cent of the accidents were due to machinery. Nearly half of the total number of accidents (43.35 per cent) were due to hand labor, the majority of which, the report says, cannot be controlled by mechanical safety devices or appliances.

The report reproduces a letter recently sent to Judge Gary by Secretary James J. Davis of the United States Department of Labor, in which Secretary Davis declares the records of his department show that, in a group of plants composed largely of the Steel Corporation's subsidiaries, the accident frequency ratio has dropped from 60.3 per million hours of exposure in 1913 to 10.2 per million hours of exposure in 1924, a reduction of 83 per cent.

Organize Program to Learn Foundry Costs

At a recent meeting of the American Foundrymen's Association committee on foundry costs, a study was made of existing data of foundries having cost systems. The study led to the conclusion that relatively few foundries really know their actual castings costs, and that the future work of the committee should be of a character to educate foundrymen to the needs of using adequate systems of a practical nature and to show the advantages to the foundry industry of using uniform cost methods. The committee plans to carry out its program by means of issuing reports and conducting discussion sessions at the annual meetings of the A. F. A.

The program planned for the 1926 Detroit convention of the American Foundrymen's Association will be as follows:

A discussion by E. W. McCullough, of the United States Chamber of Commerce, on the economic necessity of adequate cost information.

An explanation of how foundry costs can be determined without excessive clerical details, by R. E. Belt of the American Malleable Castings Association.

Presentation by the A. F. A. cost committee of an outline basis for practical classification of foundry costs.

In addition to the above program the committee is planning to conduct a contest on weight and production estimates of castings from non-ferrous, steel, malleable and gray iron foundries. Pattern equipment for castings from each branch of the industry will be on display and those in attendance at the convention will be given a chance to submit their estimates of the weight of the castings and of the daily production from the use of the equipment. Prizes are to be given to those submitting the best estimates. The purpose of the contest is to focus attention on the need for accurate information regarding cost factors. The discussion session organized by the committee will be held Wednesday afternoon, Sept. 29.

To Process Coal Screenings in Cylindrical Briquette Form

The manufacture of equipment for the processing of coal screenings and coke breeze under a new process has been started by the McMyler Interstate Co., Bedford, Ohio. The machinery will be used to equip plants to manufacture fuel in a cylindrical form of briquette under the trade name of "Tubucol." Patents on the process are held by the P. W. Welton Engineering Co. from which McMyler company has secured the manufacturing and sales rights. The new process, which has been under development for four years, is said to be a considerable improvement over the briquetting process.

The equipment will be built in units with a production capacity of one and one-half, five and ten tons per hour. An experimental plant with a capacity of two and one-half tons per hour has been in operation for some time. The marketing plan calls for privately owned and operated plants to supply fuel for domestic and some industrial uses. It is stated that the coal screenings can be advantageously shipped to these plants because the freight rate is lower on that material than on commercial grades of coal. It is claimed that with the process a great deal of fuel now wasted can be utilized.

Wins Fight Against Foreign Steel in Philadelphia

The fight of the Concrete Reinforcing Steel Institute against the use of foreign steel for public school buildings at Philadelphia has met with success, and in the future the specifications in that city will call for American-made steel. The association is confident that other municipalities along the east and west coast will follow the example set by Philadelphia. The institute has petitioned the director of customs at Washington to invoke the provisions of the present law which call for marking imported goods with the country of their origin. In view of the fact that certain foreign steel bars are very close imitations of well-known American reinforcing steel bars, it is thought possible that a large quantity of foreign steel is being sold without the buyer's knowledge of its source.

The institute committee on engineering practice has drawn up reinforced concrete provisions for a standard building code in response to a request received from various cities where building codes are now being revised. In addition, the secretary has been in correspondence with the building commissioners in every city with a population of 25,000 or over, to ascertain what codes are being revised and to take the initial steps in presenting the institute's recommendations.

The membership of the institute now totals 48 fabricators, with 95 warehouses in the leading cities of the country. New members recently elected include: J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.; Midwest Steel Co., Oklahoma City, Okla.; J. J. Morgan Co., Columbus, Ohio; Patterson Steel Co., Tulsa, Okla.; Southern Engineering Co., Charlotte, N. C.; J. A. Werme Steel & Iron Works, Oklahoma City, Okla.

Employment Off in Metal Trades

Two per cent drop is recorded in employment, in the "Monthly Labor Barometer" issued by the National Metal Trades' Association, Peoples Gas Building, Chicago. Reporting from more than 30 large industrial centers, the total for May is given as 638,946, compared with 653,898 in April and about the same number in March and February. The May total is close to that for January. It is, however, about 25 per cent above the figure for June, 1924, when only 513,517 were reported.

CANADIAN PRODUCTION

Five Months Ahead of Same Period Last Year in Pig Iron, but Under in Steel

TORONTO, July 2.—The production of pig iron in Canada in May totalled 72,762 gross tons, a gain of 8 per cent over the 67,607 tons produced in April. Production of basic pig iron at 56,423 tons showed an increase of 44 per cent over the output of the previous month; of this total only 2853 tons were produced for sale and the balance was made for the further use of reporting firms. Foundry iron at 16,339 tons was 34 per cent below the 24,654 tons of the previous month. No malleable iron was produced during the month of May.

For the five months ending with May the cumulative production of pig iron of all grades totalled 300,010 long tons, an increase of 22 per cent over the output of 245,009 tons made during the same period last year. This year's output was composed of 204,845 tons of basic iron; 83,236 tons of foundry iron and 11,929 tons of malleable iron.

There was no change in the number of active blast furnaces during the month under review. Seven furnaces were blowing, located as follows: British Empire Steel Corporation, Sydney, N. S., two; Steel Co. of Canada, Ltd., Hamilton, Ont., two; Algoma Steel Corporation, Sault Ste. Marie, Ont., two; Canadian Furnace Co., Port Colborne, Ont., one.

Early in May the price of Canadian pig iron moved to a lower level, with a drop of $1.05 reported in both Toronto and Montreal markets, since which, however, no further change has been announced in Canadian prices, which are as follows: No. 1 (2.25 to 2.75 silicon), $25.80; malleable, $25.80; No. 2 (1.75 to 2.25 silicon), $25.30, Toronto. Montreal prices are No. 1 (2.25 to 2.75 silicon), $28.20; malleable, $28.20; No. 2 (1.75 to 2.25 silicon), $27.70. The Dominion Bureau of Statistics' index numbers for iron and its products based on prices at the middle of the month (1913 prices = 100) declined from 145.0 to 144.1, due mainly to the lower levels for pig iron and steel billets.

Reflecting the higher output of pig iron, the production of steel ingots and castings advanced to 89,513 long tons for the month of May, an increase of 12 per cent over the 79,936 tons of April. Production of steel ingots totalled 85,604 tons, as compared with 76,046 tons made in April. The output of steel castings was 3909 tons in May as compared with 3890 tons in April. The cumulative production for the five months ending with May totalled 349,907 long tons, as compared with 360,557 tons for the corresponding period last year.

Increased Bookings of Fabricated Steel Plate

Bookings of fabricated steel plate in May are reported by the Department of Commerce at 46,473 net tons, based on reports from 36 firms. This represents 68 per cent of capacity. The total is the highest since that of December, 1924, and, with that exception, much the highest in several years. It compares with 32,691 tons in April and with 27,684 tons in May, 1925. It is more than 25 per cent higher than the highest month of the past two and one-half years, with the sole exception above noted.

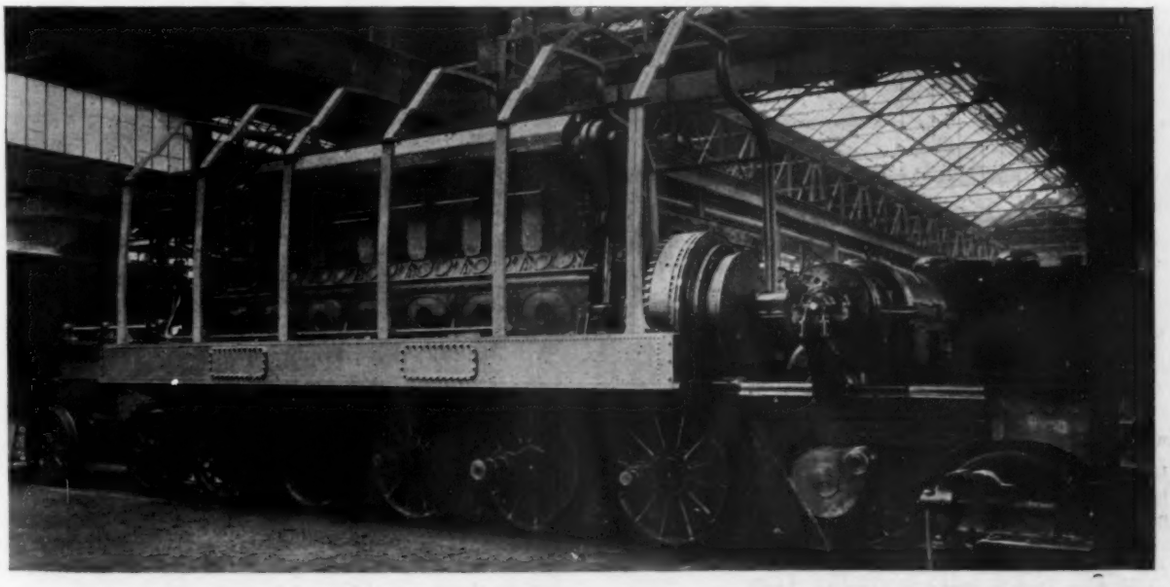
Distribution of the May bookings included 15,728 tons for oil storage tanks—the largest tonnage for this purpose since June of last year; 2733 tons for refinery materials and equipment; 2472 tons for tank cars; 4190 tons for gas holders; 1742 tons for blast furnaces, and 19,608 tons for stacks and miscellaneous. This last item was the largest under that class in more than 30 months.

For the five months of 1926, total bookings have aggregated 172,170 tons. This is a heavy gain over last year's figures, which showed 120,485 tons for the first five months, and a still heavier gain over the first five months in 1924, when bookings amounted to 101,484 tons.

Geared Diesel-Driven Locomotive

FIRST 1200-hp. Diesel locomotive with gear transmission system, operated by electromagnetic clutches, equipped with MAN Diesel engine, built in Germany for the Russian Government by the Hohenzollern A. G., Duesseldorf, and the Magnet Werk,* Eisenach. It has three speed stages, each controlled by a magnetic clutch, and is operated as easily as an automobile. Starts and runs without shocks while changing speed, the gears being always in mesh. This locomotive is the latest step in the development of Diesel locomotives. It is said to have the highest overall efficiency ever reached in locomotive history, at 31 per cent.*

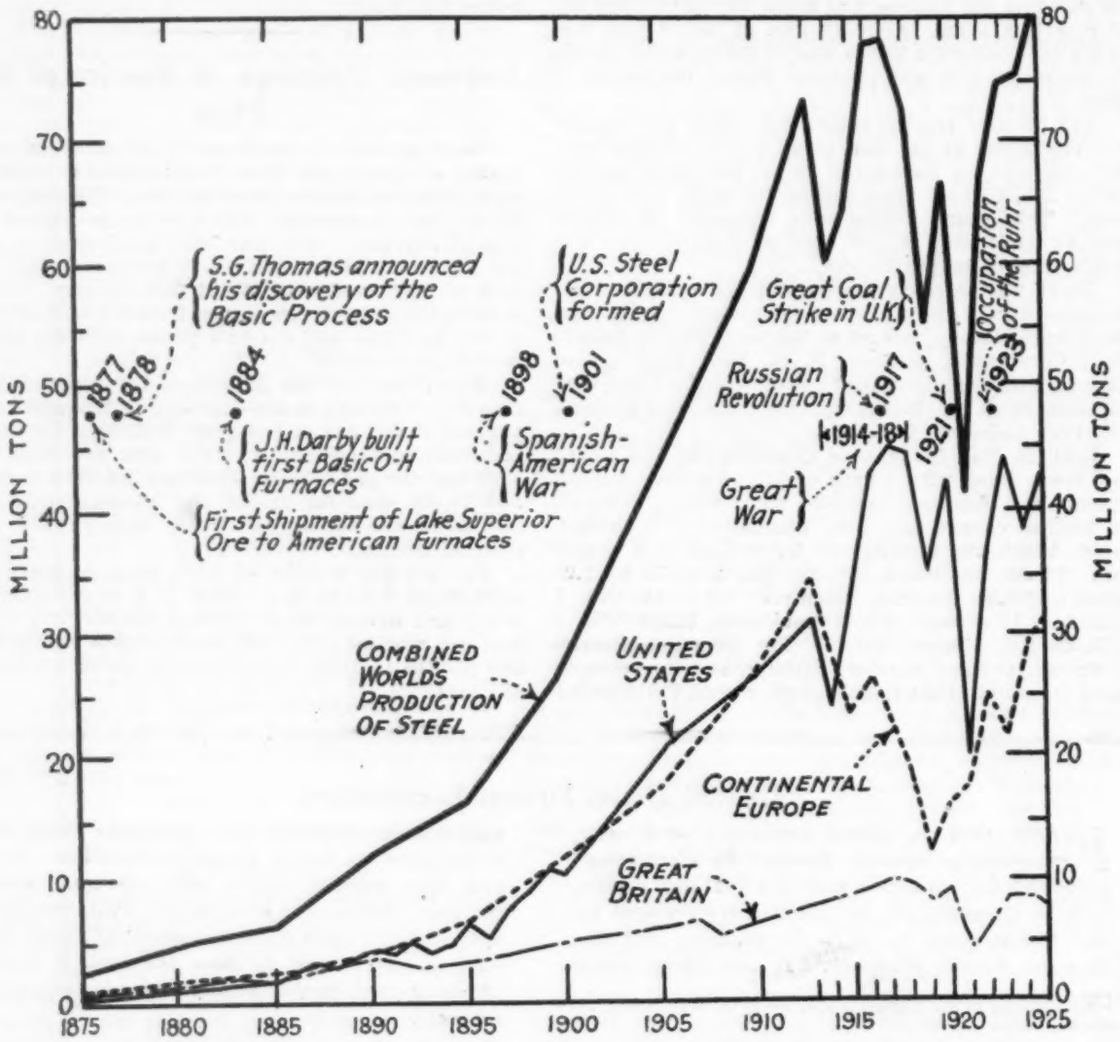
*Represented in the United States by B. A. Wittkuhns, 1440 Broadway, New York.



Growth of World Production of Steel

FIFTY years of upward growth in the production of steel throughout the world is shown in the diagram. This growth, interfered with by the World War, showed in 1925 a new high record, at about 81,000,000 tons. The diagram was shown by Sir Peter Rylands in connection with his presidential address before the Iron and Steel Institute of Great Britain.

Particularly noteworthy are the close equality in production of the United States, Great Britain and the Continent of Europe, through the latter part of the nineteenth century, and the continuing close relationship between the United States and the European Continent in the first dozen years of the present century, during which Great Britain fell away from the group.



Half a Century of Steel Output of the World and of Great Britain, the Continent of Europe and the United States

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The schedule of the next installments of the ***Business Analysis and Forecast****, by Dr. Lewis H. Haney, Director, New York University Bureau of Business Research, is as follows:* ***July 15****—Activity in Steel Consuming Industries;* ***July 22****—Position of Iron and Steel Producers;* ***July 29****—General Business Outlook.*

Reduction in Coal Consumption

Industrial consumption of coal in May is estimated by the National Association of Purchasing Agents to have been 35,213,000 net tons, compared with 39,048,000 tons in April and much larger quantities in preceding months. Production in May was the lowest of any month of the year, having been 47,113,000 tons, compared with 48,008,000 tons in April.

Factory coal piles have been heavily depleted, however, for the stocks in industrial hands as of June 1 showed 28,198,000 tons, compared with 36,876,000 tons May 1, and with much larger figures in earlier months. Supplies on June 1 in steel plants are estimated as covering 26 days' use. By-product coke plants were down to 11 days' supply, while electric utility and coal-gas plants had enough for 37 days and the railroads for 23 days.

In This Issue

Germany again leads the world in iron and steel exports.—Her total for the first quarter was well over one million gross tons, 2.7 times the quantity United States exported. —Page 99.

Can the broadcasting of "safety first" warnings be overdone?—It may be better to focus attention on the points where the element of danger exists rather than to create a nervous fear or an equally undesirable indifference, born of familiarity, by indiscriminate plastering of factory walls with safety injunctions.—Page 100.

Proper distribution of wealth a serious problem, says Dean Kimball.—This civilization will inevitably go the way of all others if the creation of wealth outpaces its distribution.—Page 97.

What causes the relation between grain size and strength of metals?—Stresses meet with less opposition in coarse-grained material because they can operate without the number of interruptions encountered in finer-grained material, metallurgist suggests.—Page 76.

No foreign steel to be used in Philadelphia school construction.—Concrete Reinforcing Steel Institute wins fight to have the words "American-made steel to be used" inserted in school building specifications.—Page 90.

Industry's coal pile is very low.—Only 28 million tons on hand at May 1, less than a month's supply, Purchasing Agents' Association reports.—Page 92.

Accident prevention work cuts Steel Corporation injury rate 83 per cent.—In eleven years the accident frequency ratio has been cut from 60.3 per million hours of exposure to 10.2.—Page 90.

New foundry cupola has unique tuyeres.—Small of bore and pointed downward toward the center of the hearth, they are said to produce a high temperature quickly by directing the blast into the mass of the charge. —Page 83.

Noiseless operation and increased load-carrying capacity are two of the advantages claimed for the new hypoid gear.—Sliding action, promoted by offset axes, is said also to contribute long life.—Page 84.

"Combustibility" is the wrong term to use to define rate of gasification of blast furnace coke.—Suggests that "flammability" be substituted, as denoting more exactly the property blast furnace operators seek to measure.—Page 76.

New hot-strip mill has novel drive for run-out rollers.—Each of the 97 rollers is driven by its own ½-hp. electric motor. The speed of the motors is synchronized with that of the mill by means of a generator belted directly to the mill drive.—Page 78.

Will cast iron regain its former position in the electrical machinery industry?—Annealing greatly increases magnetic induction and permeability of cast iron, British metallurgist finds. Predicts a promising future for it in the construction of electrical machinery.—Page 82.

Does quantity production of castings mean a sacrifice of quality?—No, says foundry manager, not if the management is equal to the demand made on its ability and ingenuity by the substitution of skilled workmen for untrained help.—Page 82.

The agricultural problem can not be solved by the application of manufacturers' hard-won experience.—The farmer's dependence on the weather forbids the drawing of a parallel between agriculture and industry, says IRON AGE reader.—Page 101.

Fabricated steel plate bookings highest in 17 months.—Thirty-six firms report total of 46,473 tons for May, representing 68 per cent of capacity, not equalled since December, 1924.—Page 91.

Should not Sir William accord the natural growth of this country a place in accounting for our steel supremacy?—The emphasis is placed on the economies resulting from consolidations, but perhaps Sir William Rylands should consider in addition not only the country's growth, but our ore deposits on Lake Superior as very important factors.—Page 98.

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Cooperative Spirit Again Illustrated

AN achievement in closely estimating data on a large scale and in a short time was the good fortune of THE IRON AGE last week. Collecting by wire in one day the production of 231 furnaces making over 3,235,000 tons of pig iron and arriving at a total only 540 tons less than the actual output as determined this week is worthy of comment.

It is a striking example of the cooperation of blast furnace companies in their readiness to give accurate as well as prompt assistance to an effort which means so much to the entire industrial fabric, let alone the iron industry itself. That on July 1 readers could get dependable statistics of production for the month just ended speaks volumes for the care in the estimates for the last days of June.

For News Summary See Reverse Side

New Personnel of Rogers, Brown & Crocker Brothers, Inc.

Several changes in the organization of Rogers, Brown & Crocker Brothers, Inc., became effective July 1 in view of the desire of several of the officers to retire from active business. D. Fairfax Bush, who has been chairman of the board since the new company was formed by the merger of a year ago, has resigned, as have also D. B. Meacham, Cincinnati, vice-chairman, and J. K. Pollock, Cincinnati, and W. T. Shepard, Buffalo, vice-presidents. Mr. Bush will remain on the board of directors, but the office of chairman will not be continued, the company being headed by Arthur A. Fowler, president. Successors to the retiring vice-presidents will be named at a meeting to be held this month. Some of the company's sales managers who have acquired an interest will be elected to the positions now vacant and a feature of the new organization will be a plan of profit sharing.

Industry at 84 Per Cent, an Unusual Summer Rate

A questionnaire on the industrial situation sent to more than 3000 members from the office of the National Association of Manufacturers, New York, brought replies from 2005 companies in 30 industries. These companies reported that the number of employees required in their plants to maintain maximum capacity was 1,675,180, an average of 835 per company; and that they now have under employment 1,407,708, or an average of 702 persons per plant. Thus the rate of operations is at the remarkable percentage of 84 at a time of year when ordinarily there is a considerable falling off.

President John E. Edgerton of the association says there is no slump in production, employment or wages. "We hear reports from various sections that sales have diminished somewhat and that the values of the sales have dropped; but the fact that our production is keeping up almost to a maximum winter load, would indicate that the sales situation is one of postponement rather than permanent decline. Diminished sales is the rule in the summer and we do not see anything to indicate that the present situation is anything more than the normal dropping of interest of the consuming public and pressure of the sales forces."

Buildings That Are Safe During Earthquakes

SAN FRANCISCO, June 29.—When an earthquake comes, the safest place to be is in a large, well-constructed, steel skyscraper, Prof. Bailey Willis, of Leland Stanford University, one of the foremost seismologists in America, told the annual convention of the National Association of Building Owners and Managers, June 21, at Del Monte, Cal. Such large buildings, he said, are given good engineering and are well inspected and well constructed. "When the earthquake sets the foundation in motion the natural period of swing of the large buildings is much slower than the earthquake period is likely to be, and hence the vibration will be broken up. Most of the large buildings have deep foundations, which give assurance of moderate vibration. Those set on rock experience practically only a shiver during an earthquake."

Professor Willis also approved the use of reinforced concrete as a building material for structures of moderate size and advised the use of reinforced concrete for panel walls in the larger structures in order to prevent the crushing of weaker substances during the period of the swing.

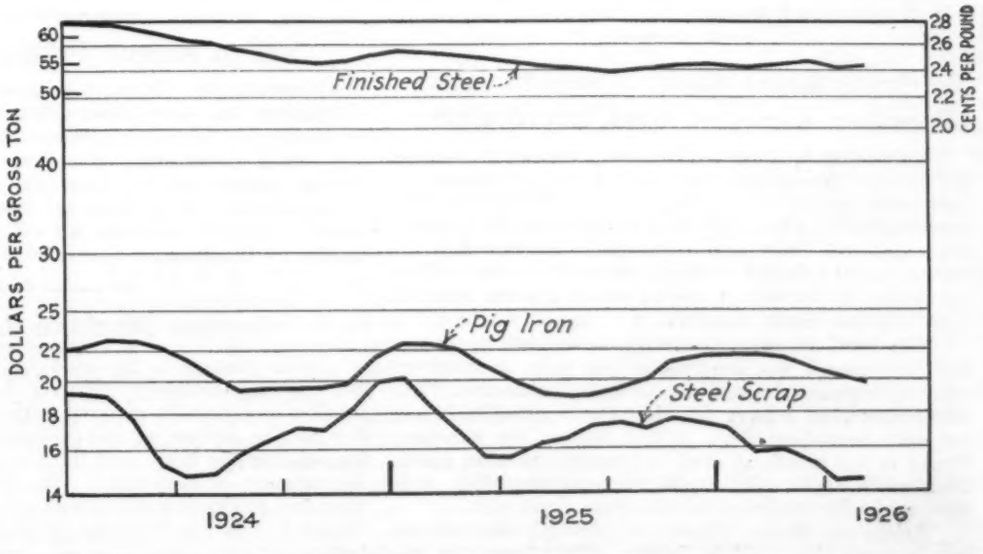
Scrap Prices Starting Up-Grade

AVERAGE prices of heavy melting steel scrap at Chicago, Pittsburgh and Philadelphia in June were $14.40 per gross ton, compared with $14.35 in May. There has been a sharp decline from the $16.97 of January. A steady improvement took place during June, however, for the latest quotation was $14.92, compared with $14 on June 1. The table and diagram set forth the monthly averages for this steel scrap composite, alongside those of pig iron and finished steel. The table covers 18 months; the diagram, 30 months.

It would appear from the diagram that changes in scrap prices precede similar changes in pig iron prices by several months.

Composite Prices on Iron and Steel Products

	Steel Scrap	Pig Iron	Finished Steel Per Lb.
January, 1925	$20.10	$22.44	2.560c.
February	18.27	22.50	2.546c.
March	16.92	21.99	2.537c.
April	15.48	20.95	2.503c.
May	15.46	19.85	2.460c.
June	16.09	19.22	2.440c.
July	16.46	18.96	2.435c.
August	17.23	19.01	2.413c.
September	17.42	19.38	2.397c.
October	17.08	19.92	2.405c.
November	17.63	21.17	2.433c.
December	17.37	21.54	2.450c.
January, 1926	16.97	21.54	2.447c.
February	15.50	21.52	2.428c.
March	15.83	21.39	2.433c.
April	15.27	20.52	2.439c.
May	14.35	20.27	2.416c.
June	14.40	19.82	2.420c.



Steel Scrap Has Been Weak Since the Break of the Year. Its recession is being followed by pig iron, which is now at the lowest level since last October

APPRENTICES IN CONTEST

Foundrymen to Award Prizes for Best Patterns and Castings at Detroit Convention

In order to encourage apprentices and to direct attention to apprentice training work, there will be held in connection with the 1926 convention of the American Foundrymen's Association at Detroit in September, a contest in molding for foundry apprentices. It is the hope of the officers that this contest may become an annual event. At the convention in Milwaukee in October, 1924, such a contest was conducted by the association for foundry apprentices in Milwaukee with satisfactory results in every way. A committee of Milwaukee foundrymen were in charge of that contest. They selected castings to be made in competition by apprentices in various divisions, a board of judges composed of visiting foundrymen was appointed and the contest was held in the foundry of the Milwaukee Vocational School. Substantial cash prizes were awarded by the association to the successful contestants.

This year the contest will be held on a national scale. The apprenticeship committee of the American Foundrymen's Association has selected patterns to be made in competition in both the steel and the gray iron division. Blueprints of these castings are available which clearly indicate the manner in which the patterns are to be made. Local contests will be sponsored by branches of the American Foundrymen's Association or other recognized organizations of foundrymen or manufacturers. The best castings from each local contest will be forwarded to the convention in September, where a board of judges will select the best casting in each division. Each casting will be marked with a number instead of the name of the contestant and the time required to finish the mold will also be indicated for the information of the judges.

The contest will be held according to regulations which have been established by the American Foundrymen's Association. These can be obtained from the secretary.

Prize for Industrial Advertising

Advertising of industrial products in trade or professional journals will this year come within the scope of the Harvard Advertising Awards administered by the Harvard Business School, Cambridge, Mass. A prize of $2,000 will be given for the industrial campaign of the year considered by the committee of judges as the most conspicuous for the excellence of its planning and execution. The Harvard Advertising Awards were founded by Edward W. Bok in 1923. Awards are made annually and the advertising material to be considered for the current year must be received by the secretary of the Harvard Business School on or before Dec. 31, 1926. The personnel of the jury will be announced later.

To Bring Light Sheet Prices in Line—President Campbell Sees Improvement

YOUNGSTOWN, July 6.—President James A. Campbell of the Youngstown Sheet & Tube Co. announces that sheet producers are planning to change the differential between the lighter and heavier gages of sheet steel and will issue new price lists effective Aug. 1. The principal purpose of this change is to bring in line the prices of the lighter gages, which makers contend have been relatively too low.

"The steel business is better now than we hoped and the outlook for the rest of the year is brighter than we expected," President Campbell observes. "All indications that I have found point to good business, not only beginning Sept. 1, but during the summer. Stocks in the hands of steel consumers are even lower than we thought. We expected a summer lull, and were agreeably surprised to see none develop.

"Prices are better. They are strongly maintained and in some lines will be better. Steel bars, for instance, cannot be bought for less than $2 per 100 lb. Consumers thought they would break the market and ordered little tonnage in June. But they are now buying at the price announced June 1 and will continue to buy heavily."

June shipments of the Sheet & Tube company were about equal to those of May. Mr. Campbell mentioned the automobile industry as one that is consuming more steel than was expected earlier in the year.

To Buy Cincinnati Warehouse

PITTSBURGH, July 6.—Negotiations are in progress and will probably be completed soon for the transfer to the Jones & Laughlin Steel Corporation of the warehouse on Smith and Front Street, Cincinnati, of the Bourne-Fuller Co., Cleveland. This is the largest warehouse in Cincinnati, occupying about one-half of a city block and located only a short distance from the Cincinnati River Rail Terminal Transfer Co. Acquisition of the warehouse by the Jones & Laughlin Steel Corporation will give it warehouses at three points, Pittsburgh, Cincinnati and Memphis, reached by rail and river and an all-rail warehouse at Chicago. The company has been a pioneer in the use of inland waterways for the shipment of steel and the negotiations for the Bourne-Fuller warehouse were instituted to further assist in the distribution of its product through ownership of warehouses that could be reached either by rail or the river.

Fewer Crucibles Made

WASHINGTON, July 5.—Establishments engaged primarily in the manufacture of crucibles reported a total output valued at $2,322,144, in 1925, a decrease of 33 per cent as compared with 1923, according to data collected at the biennial census of manufactures by the Department of Commerce. Of the 12 establishments reporting for 1925, five are located in Pennsylvania and the remainder in Connecticut, Illinois, Indiana, Massachusetts, New Jersey and New York. One establishment which reported production in 1923 was idle in 1925.

Grinding Wheels Simplified

Simplified Practice Recommendation No. 45, issued by the Bureau of Standards, Washington, and obtainable for 10c. from the Superintendent of Documents, Government Printing Office, Washington, tells of the reduction in number of sizes and types of grinding wheels, which has been made in the effort to reduce costs. The combined efforts of the conferences have eliminated more than 64 per cent of the number of varieties and sizes, the reduction having been from 715,200 to 255,800 varieties. The pamphlet is illustrated and contains considerable tabular matter.

Bill to Amend Patent Procedure

WASHINGTON, July 6.—Representative Goodwin, Minnesota, has introduced a bill to amend the patent procedure in the Patent Office and in the courts. The bill would particularly amend sections of the revised statute relating to the granting of letters patent for inventions and to interfering patents. It is expected that an effort to pass the bill will be made at the next session of Congress.

German Machine Sales Poor

Little change is reported in business activity of the German machinery industry during May, or in the number of contracts received during the month, according to the review of the German Machine Builders' Association for May, says the European Division of the Department of Commerce. The slight increase in orders and production registered since February has continued, but in the majority of plants business remains bad.

Power, Fuels, Caterpillar Tractors

Mechanical Engineers Discuss Several Topics at San Francisco —Dr. Millikan Honored

TECHNICAL discussions on fuels, railroads, vocational training and the utilization of hydraulic, gas and oil power for industrial purposes, together with numerous tours of inspection to Pacific Coast manufacturing plants, scenic excursions and a banquet —at which Dr. Robert A. Millikan, executive president, California Institute of Technology, was presented with an honorary medal in recognition of his contributions to science and engineering—were features of the annual spring meeting of the American Society of Mechanical Engineers, June 28 to July 1, at San Francisco. About 500 members and guests were registered at the convention headquarters in the Palace Hotel.

W. L. Abbott, president of the society, called to order the first session, devoted to routine business. Following this meeting, members of the society were luncheon guests of the Electrical Development League of California. Dexter S. Kimball, dean of the college of engineering, Cornell University, was the principal speaker.

More Equal Wealth Distribution

"If modern civilization is not to go the way of ancient civilization," he said, "governments must realize that the distribution of wealth is equally as important as the creation of wealth. As I see it, the next move of the engineering profession will be toward a broader consideration of economics. In the last 25 years we have seen a gradual increase of ownership of industries by the workers. Whither this trend will lead us in the next 25 years I do not pretend to prophesy. But I do know that mass production must be matched by mass management, if a stable balance is to be maintained.

"This is an age of promise and progress and, just as industry progresses, so government must progress. Our civilization rests primarily upon manufacturing and industry. Industry and manufacturing rests upon engineering and science. Unless the distribution of wealth keeps pace with the creation of wealth, civilization must suffer and go the way of those ancient civilizations which crumbled and passed away. I believe the engineers and scientists should point the way toward a more even distribution of wealth in ratio with its creation."

Petroleum Problems Discussed

Two sessions were held simultaneously on June 29, one under the auspices of the petroleum division; the other under the auspices of the committee on education. At the petroleum session, W. R. Eckart, professor of mechanical engineering, Leland Stanford University, presided. A paper on the "Fluid Flow in Pipes of Annular Cross-Section," by D. H. Atherton, professor of mechanical engineering, University of California, Berkeley, reported investigations to determine the values of the friction coefficients for the flow of air, oil and water through pipes of annular cross-section. It was stated that the coefficient of friction corresponding to any turbulence factor for both turbulent and viscous flow has a value for pipes of annular cross-section slightly higher than for pipes of circular cross-section, when determined by the equivalent-diameter formula.

A paper on "Mechanical Engineering in Cracking, Heating and Cooling of Oil," by B. N. Broide, chief engineer, industrial department, Superheater Co., New York, dealt with the combustion and furnace design of pipe stills used for refining or cracking heavy oils into lighter hydrocarbons. It was stated that the main reason for the rapid development of the pipe still is due to the fact that oil flows through the tubes with high velocity, protecting them from overheating. With earlier pipe stills, various devices had to be used to protect the bottom of the shell directly exposed to the furnace. Stills must be so designed, it was stated, so as to allow access to the tubes. The recently developed pipe stills are made of straight lengths of pipes connected by return headers to form a continuous coil or series of coils.

Oil as a Fuel

The fuel and railroad session on June 30 was largely attended. C. L. Cory, dean of the college of mechanics, University of California, presided. A paper on combined oil-and-gas-burning furnaces for power plant use, by J. Grady Rollow, electrical engineer, Los Angeles Gas & Electric Corporation, stated that in the designing of a furnace for handling oil and gas the requirements for oil are the determining factors. Any furnace rightly proportioned for oil will also handle gas successfully. The majority opinion of designing engineers today, it was stated, seems to be that no unprotected refractory can endure for long where very high boiler ratings are developed with mechanical atomizing oil burners. As a result, practically all of the plants recently designed to meet these conditions protect the furnace with air cooling, water screens, or radiant superheaters.

Genesis of Caterpillar Tractors

A paper on the caterpillar tractor and its application to industry was presented by Pliny E. Holt, vice-president and director of engineering, Caterpillar Tractor Co., Stockton, Cal. In the development of the traction engine two men in the West stood out as pioneers and successfully solved the problem—Daniel Best at San Leandro and Benjamin Holt at Stockton. Tractors with wheels of extreme width were built originally. The climax of this was a tractor built by the Holt Mfg. Co. for Charles Moreing about 1898, which had wheels about 8 ft. in diameter and 18 ft. in width on each side of the tractor. It emphasized the fact that the weight increased almost in proportion to the width of the wheels, so very little was gained. Early in 1900 Benjamin Holt built a pair of tracks, or "platform wheels" as they were then called, and installed them on one of the steam tractors. This worked so well that it encouraged him to build another, and thus the modern "caterpillar" had its inception. Gasoline-driven caterpillars were first put into use in 1905.

Become an Engine of War

"About two years prior to the World War the German Government and Austro-Hungarian landowners had become large purchasers of caterpillar tractors, and had them pretty well in use throughout the German Empire. It was later revealed that these tractors, in their pre-war agricultural work, were operated by soldier drivers detailed for that purpose. The Holt Mfg. Co. had no intimation of the military uses planned for these tractors until the news of the Belgian invasion.

"The English captured one of these tractors in the early part of the war, and it has been proved by the testimony of Gen. Sir Ernest Swinton, in the recent trial in England to establish the true origin of the tank idea, that this tractor which he saw, which was formerly owned by the German Government, was the basis upon which the English developed the design of the world-renowned tanks."

Every afternoon of the four days of the meeting saw tours of inspection to industrial plants. The Southern Pacific Co. brought its latest type 3-cylinder locomotive to San Francisco especially for members to inspect. This locomotive, designed by engineers of the Southern Pacific Co., is 101 ft. 1 in. in length, weighs 688,200 lb., develops 3800 hp. and has ten drivers.

Fay, Spofford & Thorndike, consulting engineers, Boston, have removed their offices, effective June 26, from 200 Devonshire Street to the Waterman Building at 44 School Street.

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The International Steel Handicap

AT the annual meeting of the British Iron and Steel Institute, held early in June, Sir William Peter Rylands considered in his presidential address the past and future of the steel industry. His remarks were drawn from a consideration of the production records for the last half century. The plotted data are reproduced on page 92 of this issue. The curves warrant the close study of American executives, each of whom, having drawn his own conclusions, will do well to steer his course accordingly.

Sir William viewed the curve showing production of steel in Great Britain with much pessimism. Since 1890 both the United States and the Continent, before then getting a third of the business, have rapidly outstripped his own country. He believes this movement to be due to the concentration of foreign business into large industrial groups. By resulting economies in management, mass production and in some cases selling agreements and the artificial helps of governmental tariffs, he finds the American and Continental steel industries have been able to undersell effectively their competitors in Great Britain, with the result that today the British industry is a group of rather small independent plants occupied largely with specialties and quality products rather than lower grade tonnage. In his mind, to diagnose the ailment is to state the cure; but he looks for no great improvement within the next few years.

Many incidents are noted on Sir William's historical curve, such as the passage of various tariff acts, the formation of many industrial groups, and the adoption of metallurgical improvements. (Some of these are reproduced on page 92.) It is also a nice point to determine how much of American iron and steel expansion has been due to the increasing and general prosperity of our country—or, on the other hand, whether general prosperity is not profoundly enhanced by expansion of the metal industry. However, we feel that Sir William has minimized rather than emphasized the influence of ore deposits upon the production curves. Unquestionably, our dominating position in steel would never have been secured without the ore deposits on Lake Superior.

If this be granted, the American industry as a whole should give a little thought to the permanency of this ore supply. It is a bonanza. All bonanzas are rapidly worked out—that is a historical fact. And Dr. W. O. Hotchkiss, now president of the Michigan College of Mines and formerly State Geologist of Wisconsin, recently stated that "present merchantable grades of iron ore in the Lake Superior district will become exhausted in about twenty years."

Dr. Hotchkiss was speaking, no doubt, of proved ore reserves, and any one who has followed mining knows that this is a rather elastic figure. Indeed, it would probably be an economical plan to restrict development and exploratory work to an amount which would always keep the "ore in sight" to a 20-year supply. The statement only emphasizes the well-known fact, however, that the high-grade ores are rapidly being scooped out by steam shovels.

While prophecy is always dangerous, it is less risky when done in the knowledge of history. Iron will doubtless go the way of gold, silver, copper, lead and zinc. First the surface deposits of high-grade ore are exploited in feverish haste. Next the underground massive bodies of simple, pure ores are worked out. Then the complex and the disseminated ores are mined, to be separated and concentrated.

Doubtless the American iron and steel industry is a long way from the complex ore treatments which have resurrected many Western mining camps. Still, executives with a long vision will agree that it is none too soon to consider the gradually decreasing quality of their ore supply. The next generation of men in the steel industry will be concentrating their ore to bring it to furnace grade, and will be able to do it successfully and without too much lost money, if the necessary preliminary investigations have been undertaken.

Germany Again Leads in Steel Exports

IMPRESSIVE in volume, both actual and relative, are the exports of iron and steel from Germany this year. For the first quarter, the period covered by the latest data, the total was 1,101,100 gross tons, or 367,000 tons per month. Thus Germany leads among European countries for the first time since 1914. In fact she has resumed the leadership of the world in steel exports. Quite in contrast are the exports from the United States, which for the first quarter were 399,460 tons, or less than 40 per cent of the movement from Germany. Only about 8 per cent of Germany's shipments abroad was pig iron, indicating that her mills have been successful in distributing rolled steel. While French exports also have been heavy, over 17.5 per cent has been pig iron. With Germany's contribution to the world's foreign trade in steel now nearly 71 per cent of the 1914 volume, her competition assumes large importance. Since German steel-making capacity is much less than that of pre-war years, the achievement is in all respects remarkable.

Momentum in Steel

IT will easily be recognized without the citation of figures in detail that if any allowance be made for "seasonal variation," and the steel trade seems to be convinced that there is a seasonal variation, mills are now operating at the highest rate ever attained.

The present period of heavy production of steel began Jan. 1, 1925. The average rate of ingot production from then to July 1, 1926, a year and a half, was 146,500 tons per working day. This represents 81 per cent of estimated capacity. Last month's production was not far from that rate and by the experience of the past two years June would be expected to be seasonally below the general average. The maintenance of a high rate of steel production for so long as eighteen months is in itself impressive, but considering the ups and downs of steel in the past the continuance of the pace is still more so.

There are no signs that the steel trade has worked itself into what may be called a technically unsound position, by accumulation of stocks in the hands of buyers or by prices having advanced so that buyers become increasingly careful about fresh commitments. It is well remembered how before the war the trade used to get into that position, a readjustment being eventually dictated.

Thus the steel industry is running with a momentum, but the momentum is different from that shown at previous times. It is not a case of order books being filled any distance ahead, for the buying right along has been chiefly for prompt shipment. It is the actual consumption of steel that has the momentum and the consumption cannot continue except by continued buying and production.

An important consideration bearing on the continuance of the momentum in consumption is that the distribution of steel is much more variegated than formerly. The time was when a few lines—rails, freight cars, fabricated steel, etc.—would account for a large part of the total demand. These represent smaller percentages than formerly, and even the automobile trade, which is very new in point of years, cannot show variations to account for any large part of the total.

Steel consumption cannot be followed so readily in detail as once was possible. It depends more today upon the state of business in general. Some experience will be needed before it can be decided whether this will make for much greater steadiness than used to obtain in steel. Appearances are that it will. One thing already established is that the fluctuations due to buyers accumulating stocks and then liquidating them have been well nigh eliminated and that in itself makes a great change.

Safety Rules and Warnings

SAFETY engineers have found that rules and warning signs may be carried so far as to neutralize the purpose they are intended to serve and at times even to create hazards. A case in point is that of one of the big electric power companies. It has been an unbreakable rule that when men are working so close to high-tension wires that an accidental contact might mean death, another man, an expert, must serve constantly as a watcher, observing every movement of the worker, ready to give quick warning should there seem to be a relaxing of vigilance. With improved equipment and practice this danger was removed from certain work.

A safety engineer discovered that in spite of the change the watcher was still constantly on duty, even when both he and the man he was watching were fully aware that no accident was possible. The result was, such being the working of the average human mind, that when the pair moved to a point where there really was a deadly menace the relaxing from vigilance was to a degree carried from the safe to the dangerous task. Immediately the rule was modified to apply only to danger points which were clearly indicated.

In the manufacturing plant it is well, of course, to make machinery and other equipment as near fool-proof as possible. The old practice, which has by no means disappeared, scattered danger warnings broadcast and created rigid rules to govern the movements of employees. The idea was that if the worker observed all warnings and obeyed all rules he was safe. When these are new to a person they protect him, in a sense. But either he becomes indifferent to them or else he is made afraid. Timidity is well recognized as a source of accident, as is frequently demonstrated by the hesitant motorist.

An operator should never fear his machine. If such is the effect upon him of labeling it with danger warnings, then they have increased instead of decreased the hazard. His production slows and his thoughts, too frequently centered upon danger, have a way of leading his body into it. The other type of employee, who acquires indifference to warnings, lives in the same hazard

as if there were no signs or rules at all. Occasionally in a plant the safety engineer finds signs glaringly lettered where once was danger, but now complete safety; this may produce an effect similar to that in the power system referred to above.

Present best practice in safety work lies in eliminating every unnecessary rule and taking away all but the vitally important danger warnings, then educating every employee as to the dangers incident to his labor. In many establishments this responsibility is placed upon the foreman in cooperation with the safety department. The foreman must not under any condition set a man or woman at work until that person has been given thorough instruction as to the dangers of the task and how best to avoid them. Moreover, every employee is supposed to be watched that he or she may not relax into heedless or reckless ways. This practice is one of the important factors in reducing accidents, both in number and in degree of severity. There must be eternal watchfulness, coupled with painstaking instruction and, when necessary, the enforcement of stern disciplinary measures.

Gains in Magnetic and Fatigue Testing

MARKED PROGRESS in two important fields was freshly emphasized at the annual conference of American testing engineers at Atlantic City—the magnetic and fatigue testing of metals.

A committee made up of experts in non-destructive tests reported more definite progress than has been attained in some time. The results, as reviewed in THE IRON AGE of July 1, indicate how very sensitive are the means now available for correlating the magnetic properties and heat treatment of steel. Extensive work on high-speed steel, the most complicated type, indicates that valuable information will soon be in hand bearing on the refinements of heat treatment and explaining some phenomena not understood hitherto. Already magnetic testing has solved problems which the microscope could not solve. Probably the turning point in this research was reached this year and progress will now be more rapid.

The three Atlantic City papers on fatigue were by leading investigators and were generally recognized as measurably advancing the knowledge of this intricate subject. This was particularly true as to the effect of corrosion. The view has been expressed that too much attention has been paid thus far to the mechanical phase of this research and that more study of the metallurgical side is necessary. The suggestion may well be considered.

Much credit is due the American Society for Testing Materials for the research and advance in these fields, which are but two of several in which the society has done broad work. Further knowledge of both magnetic and fatigue testing is vital both for practical and theoretical needs. Workers in these fields are calling for the cooperation of industry and assuredly they deserve to have it.

CORRESPONDENCE

Welding of Mokelumne River Conduit

To the Editor: I notice in your issue of June 3 an article in connection with the Mokelumne River conduit in California, which article is headed "Favors Riveted Pipe Line."

Anyone glancing at this would come to the conclusion that the East Bay Municipal Utility District, Oakland, had changed from welding of the pipe itself to riveting. As a matter of fact, this is not true. They have changed, it is true, from the welding of the girth seams in part of this line to riveting. The reason for the change to the riveted joint on the girth seams was to eliminate any possibility of locked-up stresses causing difficulty in the line because of change of temperature of the water or of atmosphere. It is the hope of the engineers that the riveted joints will act as expansion joints to some extent and relieve these stresses.

I believe it is safe to say that the engineers are very anxious to weld the girth seams and that they are taking steps at the present time so that most of this pipe line will not only have the longitudinal seams in the pipe itself welded, on which there never has been any question, but also they expect to weld the girth seams by the electric process in a way which will entirely eliminate the shrinkage stresses, which the previous gas process (which was used at first) introduced.

It is only fair to say also that there has been no proof whatsoever, from the tests which have been conducted, that the welding of the girth seams with the gas process is not entirely successful. In fact, the result of the first and only test which has been put on any section of the completed line shows definitely that, at a pressure above the highest working pressure which will ever be put on, there is not a single leak in any part of the line where the longitudinal seams have been welded with the arc process and the girth seams with the gas process.

There is not the slightest doubt that riveted girth seams will introduce the difficulty of leaks to a large extent, and it is only because of the fear that something might happen that this change in process has been made in the girth seams. There is no indication whatsoever that any such result has occurred, or will occur in the future, and I think it is safe to say that the change was made entirely because of the fear that something might happen rather than from any possible indication that anything would happen.

J. F. LINCOLN,
Vice-president, Lincoln Electric Co.

Cleveland, June 24.

[The article in THE IRON AGE of June 3 sustains the contentions of Mr. Lincoln. We agree with him, however, that the heading to that article was not fully descriptive of its contents and we are glad to print his letter to correct in a prominent way any misleading views which may have been gathered regarding the question.]

Advice from Other Industries Cannot Solve the Farmer's Problem

To the Editor: In an editorial concerning the case of the corn planters published in THE IRON AGE of June 24, the writer expressed a vague conception of farm management and criticized the agricultural industry for poor management. The editorial cited the case of the manufacture of textiles, boots and shoes, and the mining of bituminous coal, indicating that the management of these industries was superior to that of the agricultural industry, inasmuch as they had overcome difficulties similar to those confronting the farmers at present.

There are problems with which the farmers have

to deal that cannot be compared with the problems of manufacture and mining, and failure to appreciate these problems only tends to make bad matters worse in the minds of all concerned. It is true that a large per cent of the farms are poorly managed; nevertheless the best business methods known to science cannot nullify or revoke the elements which largely control our basic industry. The farmers of America realize their business is largely a game of chance, and in this game it is a known fact that thousands are going to lose.

Due to weather conditions and other causes beyond their control, a certain per cent will not produce over 50 per cent of a crop, while there are many thousands of others who will lose entirely. Take the State of Texas for an example: In 1925 this State as a whole had an almost complete crop failure, while several other Southern States were nearly as bad. This was not the result of poor management but of unfavorable weather conditions, which no man can control. To some the argument might present itself that this failure in one part of the country would have a tendency to boost prices for the sections that had produced a bumper crop. As a matter of fact, the conditions would produce the reverse effect, thereby increasing the seriousness of the depression, seeing that trade is not primarily maintained by the buying power of money, but by the exchange of commodities. If Texas produces no sugar and cotton, while Iowa produces an oversupply of corn and wheat, the people of Texas will have to do without Iowa's corn and wheat, while the Iowa people must get along without Texas cotton and sugar. Of course, the State of Iowa cannot use anything like the normal Texas cotton crop, neither will Texas use the normal surplus of Iowa's corn and wheat; but their differing situations are given merely as an illustration.

It is impossible to forecast even approximately the percentage of failures which are sure to occur, and for this reason it is creditable rather than otherwise that the farming industry as a whole has taken these facts into consideration and planted so as to insure an adequate food supply, regardless of the losses which must be expected. To reduce the acreage in order to boost the price would be feasible only to a limited extent, and should reduction of acreage be carried beyond the bounds of safety, disastrous results might follow in the wake of a drouth. Then the farmers would be criticized for not providing sufficiently for the needs of the nation.

Agriculture as a whole is managed by as efficient talent as any industry in the world; but due to the nature of the business it is often confronted with problems difficult to overcome. No man, even though a brilliant success in business, is wise enough to propose a practical solution of this great problem.

As the requirements of plant life vary to the extent that the method required to grow successfully one crop would produce absolute failure with another, in like manner farming is enough different from other industries to make it impossible for one in another line of business to give practical advice in agricultural matters. The only apparent remedy is for industries to cooperate so far as sane business principles will permit, so that no one industry will suffer unduly in case of national depression. SAMUEL H. KENNEDY.

Philadelphia, June 26.

British Coal Miners and the "Dole"

To the Editor: I look forward each week to reading THE IRON AGE, despite the fact that I am not a technical man and have little knowledge of mechanical matters, my employment being with transmission and mill supply people.

There is one statement in your editorial of June 24 under the title "The Case of the Corn Planters" which excites my comment and that is

> "It is a demand for the counteraction of economic forces by means of a national dole, just as the British coal miners are similarly claiming support."

Having the misfortune (?) to be a Britisher, it is most extraordinary to find how tight this misconception of a dole still clings on this side of the water. I find that a perusal of the British papers fails to show that the coal miners are claiming a dole. All they ask for is a living wage and reasonable hours. Mind, I am speaking about coal miners, not Communists like Cooke and other extremists who do not represent the moderate-minded man. The coal miner doesn't want dole; he wants to work at a living wage.

Recently the British nation showed that it will not tolerate a group of individuals—i.e., the Trades Union Council—dictating to the whole nation. Yet it is most extraordinary that it allows another group of individuals, the coal owners, deliberately to lock out the miners, paralyze the country's trade and practically dictate to the country. The trouble in Great Britain is the extremist on both sides. We have reactionists like Lord Banbury and the Duke of Northumberland, whose sole parrot cry is "longer hours and less wages" (the line of least resistance), a doctrine not only inhuman but positively humiliating, because it admits a want of efficiency in grappling with a difficult problem in a decent manner. On the other hand people like Cooke, who "thank God for the Russians," would bring about chaos merely because they want to develop an impossible theory, viz., the complete control of all industry by the workers and the abolition of capital. It does not take much imagination to see that Brothers Banbury and Northumberland and Cooke are really allies, striving to eliminate Great Britain from the map.

Fortunately I am confident that as with a good many other problems Great Britain will solve this one and will find a way out of the coal strike. Gentlemen like Northumberland and Banbury and a few score of other Tories in England are really counterparts of the same class of individuals who lived in 1776 and who made the mistake of trying to ride roughshod over a lot of British-born colonists, but found they had bitten off more than they could chew. However, that breed will be eliminated in time.

The main thing is for all sober-minded Americans (who are not drunk with their country's prosperity) to bear in mind that the British empire is still very much alive and kicking and will be doing business at the old stand long after you and I have been buried with our fathers.

The word "dole" is all wrong. Unemployment insurance is what it is and the bulk of it is contributed by the working classes and the Government. The same thing is now in force in Germany, and in view of the fact that Germany for four years kept the world at bay through efficiency does not argue that because a dole is in force the Germans are becoming a less efficient people.

JOHN S. EMERY.

Ardsley, Pa., June 26.

[Mr. Emery supplements the above with a letter under date of July 3 in which he says: "The subject is the more interesting because, as your contributor, Col. Frank A. Scott, in his admirable article 'American Opportunity in Britain' puts it, 'an early major operation [in Great Britain] seems likely.' This article is to my mind the soundest resumé of the situation and future of Great Britain in world trade that I have read and it ought to be read by all broad-minded Americans and Britishers."

In the editorial referred to above the word "dole" was not used in its technical sense. The subsidy granted by the British Government to the coal operators last July was in effect a dole, seeing that it was a public contribution to the miners to keep them from tying up British industry by striking.—EDITOR, THE IRON AGE.]

Some weakness still is apparent in the Lake Superior ore market. A Shenango Valley pig iron producer recently bought approximately 125,000 tons, the ore coming from four sources, at prices averaging 40c. per ton below the regular quotation.

Decline in June Iron Output

Actual Data Show Daily Rate 4460 Tons, or 4 Per Cent, Under May—Net Loss in Furnaces Is Eight

FINAL figures, representing the actual production of pig iron during June, show that the estimates, gathered by wire on June 29, were very nearly correct. The actual output was 3,235,309 gross tons, or only 540 tons more than the 3,234,769 tons published last week as the estimate.

The June output was 107,844 tons per day, or 4460 tons less than the daily rate in May—a decline of 4 per cent. The estimated daily rate published last week was 107,825 tons, or 19 tons less than the actual rate. The 4 per cent loss in June compares with a 2.3 per cent loss in May. In April there was an increase of 3.6 per cent over March.

The production of coke pig iron for the 30 days in June was 3,235,309 tons, or 107,844 tons per day, as compared with 3,481,428 tons, or 112,304 tons per day for the 31 days in May. The June output is the fourth largest this year and is the largest for that month since June, 1923, when the total was 3,676,445 tons.

There was a net loss of 8 furnaces during June, 11 having been shut down and 3 blown in. In May the net loss was 9 furnaces. In April there was a net gain of 1 furnace, with a gain of 10 in May and 2 in February.

Capacity Active July 1

There were 220 furnaces active on July 1 as compared with 228 on June 1. The estimated daily capacity of the 220 furnaces was 106,140 tons as con-

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant*	Total
June, 1925	70,452	18,663	89,115
July	65,715	20,221	85,936
August	68,530	18,711	87,241
September	70,300	20,573	90,873
October	76,464	21,064	97,528
November	77,262	23,505	100,767
December	81,552	23,301	104,853
January, 1926	83,867	23,107	106,974
February	81,148	23,260	104,408
March	85,841	25,191	111,032
April	89,236	25,768	115,004
May	86,682	25,622	112,304
June	85,135	22,709	107,844

*Includes pig iron made for the market by steel companies.

Pig Iron Production by Districts, Gross Tons

	June (30 days)	May (31 days)	April (30 days)	March (31 days)
New York	195,699	229,640	236,730	232,816
New Jersey	.....	.....	.....	.....
Lehigh Valley	91,034	92,696	94,770	93,037
Schuylkill Valley	68,190	81,563	80,290	76,771
Lower Susquehanna and Lebanon Valleys	35,094	36,845	36,755	43,112
Pittsburgh district	653,044	712,232	725,982	750,190
Shenango Valley	134,156	139,201	125,384	119,090
Western Penna.	123,924	145,095	158,790	169,039
Maryland, Virginia and Kentucky	85,901	94,691	98,783	84,488
Wheeling district	117,838	133,792	123,903	125,071
Mahoning Valley	313,633	341,801	348,174	322,570
Central and Northern Ohio	323,904	344,553	340,329	322,698
Southern Ohio	49,438	49,137	46,050	50,000
Illinois and Indiana	661,758	664,477	640,173	656,524
Mich., Minn., Mo., Wis., Colo. and Utah	137,753	153,072	147,902	140,188
Alabama	238,491	254,245	237,808	244,403
Tennessee	5,452	8,388	8,299	11,989
Total	3,235,309	3,481,428	3,450,122	3,441,986

Coke Furnaces in Blast

Furnaces	Total Stacks	July 1 In Blast	July 1 Capacity per Day	June 1 In Blast	June 1 Capacity per Day
New York:					
Buffalo	21	12	5,400	13	6,000
Other New York	5	3	1,055	3	1,190
New Jersey	3	0	....	0	....
Pennsylvania:					
Lehigh Valley	12	7	2,800	7	2,770
Spiegeleisen	2	1	110	2	220
Schuylkill Valley	12	5	2,140	6	2,440
Susquehanna Valley	6	2	875	2	935
Ferromanganese	1	0	....	0	....
Lebanon Valley	4	1	220	1	230
Ferromanganese	2	1	75	1	65
Pittsburgh District	52	36	20,900	38	21,845
Ferro. and Spiegel	4	3	400	3	420
Shenango Valley	14	8	4,070	9	4,490
Western Pa.	19	9	3,865	9	4,550
Ferro. and Spiegel	2	2	270	2	245
Maryland	6	5	1,950	6	2,430
Wheeling District	12	8	3,925	8	4,000
Ohio:					
Mahoning Valley	26	19	10,450	19	10,600
Central and Northern	22	19	10,600	20	11,100
Southern	13	6	1,700	5	1,585
Illinois and Indiana	43	34	22,050	34	21,400
Mich., Wis. and Minn.	12	8	3,240	8	3,220
Colo., Mo. and Utah	7	3	1,320	3	1,710
The South:					
Virginia	16	1	245	1	270
Ferromanganese	1	1	60	0	....
Kentucky	5	1	360	1	345
Alabama	34	23	7,820	24	8,200
Ferromanganese	1	1	60	1	70
Tennessee	12	1	180	2	270
Total	369	220	106,140	228	110,600

Production of Steel Companies for Own Use—Gross Tons

	Total Iron Spiegel and Ferro		Spiegeleisen and Ferromanganese* 1925 Fe-Mn	1925 Spiegel	1926 Fe-Mn	1926 Spiegel
	1925	1926				
Jan.	2,692,537	2,599,876	23,578	5,418	29,129	7,746
Feb.	2,539,785	2,272,150	18,184	4,910	22,309	7,084
Mar.	2,812,995	2,661,092	20,062	5,449	24,064	7,339
Apr.	2,514,828	2,677,094	21,448	5,341	24,134	7,051
May	2,306,887	2,687,138	22,679	5,294	23,159	6,999
June	2,113,566	2,554,045	19,836	4,972	25,378	5,864
½ year	14,980,598	15,451,395	125,787	31,384	148,173	42,083
July	2,037,160	.....	16,614	5,074	....	....
Aug.	2,124,439	.....	18,867	4,939	....	....
Sept.	2,109,205	.....	18,381	5,162	....	....
Oct.	2,370,382	.....	21,421	5,071	....	....
Nov.	2,317,888	.....	25,490	6,375	....	....
Dec.	2,528,120	.....	26,072	7,756	....	....
Year	28,467,792	.....	252,632	65,761	....	....

*Includes output of merchant furnaces.

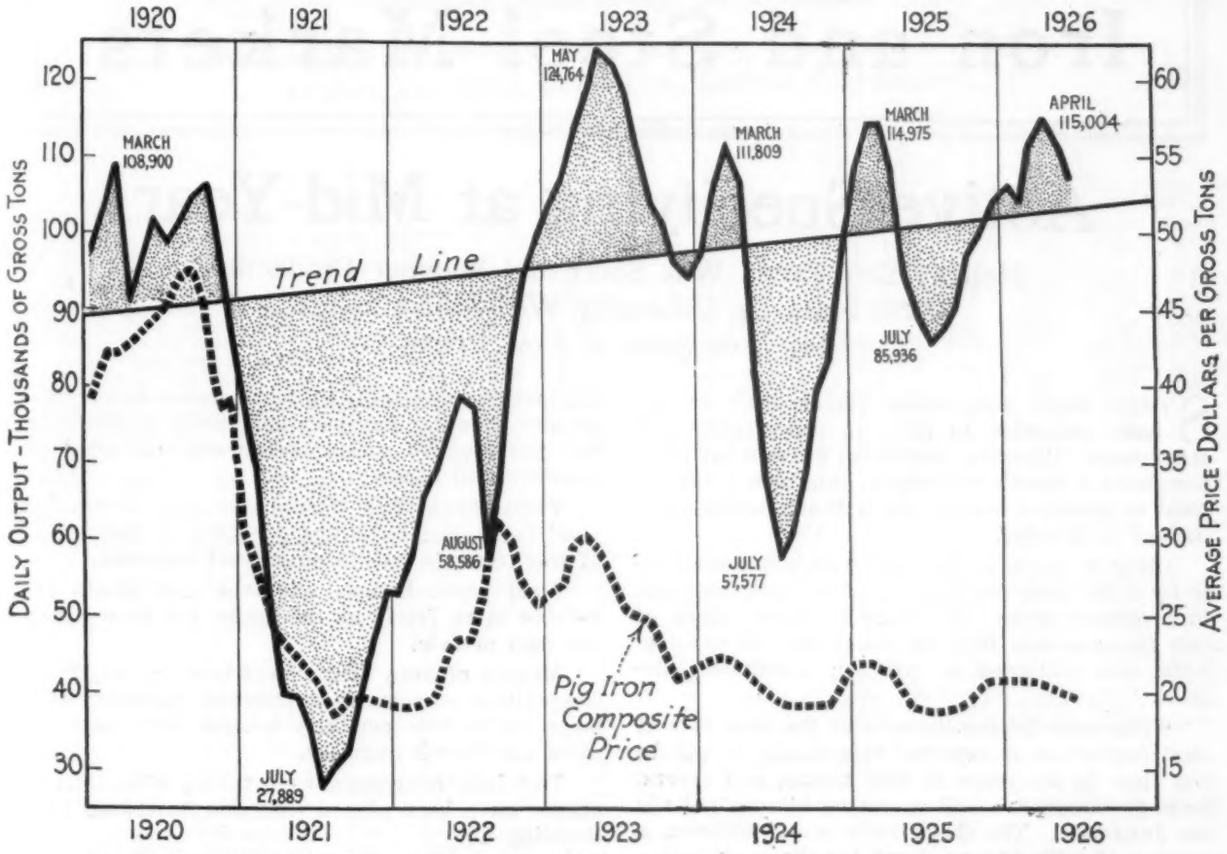
Production of Coke and Anthracite Pig Iron in United States by Months, Beginning Jan. 1, 1924—Gross Tons

	1924	1925	1926
Jan.	3,018,890	3,370,336	3,316,201
Feb.	3,074,757	3,214,143	2,923,415
Mar.	3,466,086	3,564,247	3,441,986
Apr.	3,233,428	3,258,958	3,450,122
May	2,615,110	2,930,807	3,481,428
June	2,026,221	2,673,457	3,235,309
½ year	17,434,492	19,011,948	19,848,461
July	1,784,899	2,664,024	.....
Aug.	1,887,145	2,704,476	.....
Sept.	2,053,264	2,726,198	.....
Oct.	2,477,127	3,023,370	.....
Nov.	2,509,673	3,023,006	.....
Dec.	2,961,702	3,250,448	.....
Year*	31,108,302	36,403,470	.....

*These totals do not include charcoal pig iron. The 1925 production of this iron was 196,164 tons.

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1922—Gross Tons

	1922	1923	1924	1925	1926
Jan.	53,063	104,181	97,384	108,720	106,974
Feb.	58,214	106,935	106,026	114,791	104,408
Mar.	65,675	113,673	111,809	114,975	111,032
Apr.	69,070	118,324	107,781	108,632	115,004
May	74,409	124,764	84,358	94,542	112,304
June	78,701	122,548	67,541	89,115	107,844
½ year	66,578	115,147	95,794	105,039	109,660
July	77,592	118,656	57,577	85,936	.....
Aug.	58,586	111,274	60,875	87,241	.....
Sept.	67,791	104,184	68,442	90,873	.....
Oct.	85,092	101,586	79,907	97,528	.....
Nov.	94,990	96,476	83,656	100,767	.....
Dec.	99,577	94,225	95,539	104,853	.....
Year	73,645	109,713	85,075	99,735	.....



Daily Pig Iron Output in June About 4 Per Cent Less Than in May; Composite Price Slightly Lower

Inclined line represents the gradually increasing theoretical needs of the country, and shows that production still is above the so-called normal. Dotted line represents THE IRON AGE *composite price*

trasted with 110,600 tons per day for the 228 furnaces operating on June 1. Of the 3 furnaces blown in, 2 were merchant furnaces and one was a Steel Corporation stack. Of the 11 furnaces blown out or banked, 5 were Steel Corporation stacks, 4 were those of independent steel companies and 2 were merchant furnaces.

Manganese Alloy Output

The ferromanganese production in June was 25,378 tons, or the second largest this year, January having been 29,129 tons. Only 5864 tons of spiegeleisen was made last month, or the smallest this year.

Abandoned Furnaces

Two more coke blast furnaces have been dismantled. The two Watts furnaces, located in Kentucky and owned by the Virginia Iron, Coal & Coke Co., are being torn down. This reduces the total number of coke furnaces, as likely to produce pig iron, to 369.

Furnaces Blown In and Out

Among the furnaces blown in during June were the following: No. 4 furnace of the National Tube Co. in the Pittsburgh district; the Oriskany furnace of E. J. Lavino Co. in Virginia, and the Sarah furnace in southern Ohio.

Among the furnaces blown out or banked during June were the following: One Lackawanna furnace of the Bethlehem Steel Corporation in the Buffalo district; No. 2 furnace of the New Jersey Zinc Co. in the Lehigh Valley; A furnace at the Coatesville plant of the Bethlehem Steel Corporation in the Schuylkill Valley; No. 2 Clairton furnace and No. 5 Duquesne furnace of the Carnegie Steel Co. and one furnace of the National Tube Co. in the Pittsburgh district; No. 2 Newcastle furnace of the Carnegie Steel Co. in the Shenango Valley; D furnace at the Maryland plant of the Bethlehem Steel Corporation in Maryland; one furnace of the Otis Steel Co. in northern Ohio; one Bessemer furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama, and the Rockdale furnace in Tennessee.

Site of America's Original Blast Furnace Found

The site of the Falling Creek blast furnace, credited in histories of the iron and steel industry as having been the first in America, has recently been discovered. The location of the furnace on the shore of Falling Creek, seven miles south of Richmond, Va., was established by the finding of blast furnace slag. This slag shows that in the process used in that time, about 1619, only a small percentage of the iron was extracted from the ore. The slag is in very large lumps and extremely hard, as is characteristic of all charcoal produced slag. A curious feature is that large pieces of charcoal are imbedded in the slag, a fact which surprised the discoverers, as it was not known that charcoal would withstand the elements for 300 years and remain in a state of perfect preservation.

R. C. Wight, of Wight & Co., Inc., Richmond, Va., slag shippers, is much interested in the discovery, and with others, has proposed that the site of the Falling Creek furnace should be marked by the erection of a monument to designate the spot where the American iron and steel industry had its birth. Pieces of the slag will be deposited in the Virginia mineral exhibit.

The first group of tin mills in the 24-mill plant of the Youngstown Sheet & Tube Co. at Indiana Harbor, Ind., will be ready for operations Aug. 1, and the piercing mill of the new seamless tube mill plant at the Campbell works will be ready within a few weeks.

Iron and Steel Markets

Active Specifying at Mid-Year

Holiday Shut-Down Was Short and Summer Production Will Hold Up Unusually Well—More Large Pig Iron Sales at Low Prices

STEEL works suspensions for the July holiday have amounted to little in comparison with other years. Whereas, slackening demand has often permitted a week's shut-down, this year's curtailment at plants of some of the largest producers was limited to Monday.

Other evidence of the continuance of recent activity is the large volume of specifications that came to producers in the last week of June. Much of this business was bars on which the old price of 1.90c. was continued on definitely scheduled deliveries.

While some letting down from the June rate of steel production is expected this month, it will be less than in six years at this season, and several large producers are still operating at substantially the June rate. The sheet trade is an exception, a number of mills having closed for the week.

Complete reports of pig iron production for June make the total 3,235,309 tons. THE IRON AGE'S estimate of last week was 3,234,769 tons, or within 540 tons of the actual. Last month's daily rate was 107,844 tons, against 112,304 tons in May.

For the 220 furnaces in blast July 1 (out of a total of 369) the daily capacity was 106,140 tons, comparing with 110,600 tons a day for 228 furnaces at the beginning of June.

Steel ingot figures for June, which will appear this week, are likely to show nearly as close an approach to the May rate as was made in pig iron.

Further sales of steel bars have been made at the new 2c. price. On the one hand its maintenance is helped by the heavy tonnage booked for the third quarter; at the same time, due to these bookings, new demand is expected to be relatively light in July and August.

Pipe stands out as the most active of finished steel lines, oil country pipe in particular. On some sizes of casing, deliveries range from four to six weeks, as against one week early in the year.

Sheet manufacturers will put into effect Aug. 1 new lists of extras which will increase the differentials on light as compared with the heavier sheets. For some time competition has been keenest on the lighter gages.

Sheet bars have been sold at the equivalent of $35, Pittsburgh, for shipment into outside territory, this being also the Cleveland price on some recent sales. Commonly $36, Pittsburgh and Youngstown, has been maintained.

Of structural awards of 25,000 tons in the week the largest was 7800 tons for a New York office building. Pending projects of about 20,000 tons include 4000 tons for a New York hotel, 4000 tons for a manufacturing plant at Dayton, Ohio, and 3500 tons for a Chicago business building. The June bookings of structural steel by the largest independent producer were 40 per cent greater than for any previous month of the year, and the month's total considerably exceeded its monthly mill capacity.

Philadelphia has barred the use of foreign steel for public buildings, yielding to the urging of the Concrete Reinforcing Steel Institute.

Steel products used in motor car plants are moving more freely as the latter get to work on the new models.

Makers of alloy steels have been in very close competition on some recent Detroit business. One large automobile company bought 6000 tons for third and fourth quarters.

Two lake freighters, each taking 5000 tons of plates, have been placed with the American Ship Building Co.

The heavy buying of foundry and malleable pig iron has kept up in the past week, particularly in the Central West. Cleveland offices booked 170,000 tons, after taking 200,000 tons in the final week of June. Chicago's total for last week was 100,000 tons. Prices, in contrast with those for heavy steel products, have been at the year's low level, leading a good many founders to contract for the full second half.

An eastern Pennsylvania steel company bought 15,000 tons of basic iron at $21 and $21.25, delivered, and a cast iron pipe company closed for 10,000 tons of pipe iron.

June shipments of Lake Superior iron ore, 8,770,000 tons, showed a large gain over May, but to July 1 the season's movement was but 14,893,000 tons, or 3,500,000 tons less than the 1925 total to that date. However, the lake fleet should easily make up the tonnage lost because of ice in April and May.

Scrap prices are slightly on the up grade, the average for heavy melting steel at Pittsburgh, Chicago and Philadelphia in June having been $14.40, compared with $14.35 in May. In the last week of June the average was $14.92, a rise of 92c. per ton since the first of that month. The June, 1925, average was $16.09.

Machine tool manufacturers have had uncommonly good business for this time of year and look for nearly the present rate of shop operations through July and August.

Bounties granted by the German Steel Syndicate on semi-finished materials and rolled steel used in manufacturing for export have been increased as a result of the new franc collapse. German exporting manufacturers are now getting materials at much below pre-war prices.

THE IRON AGE composite price for finished steel stands at 2.431c. per lb. for the third week, and was at exactly the same level one year ago. Pig iron remains at $19.71 for the second week.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

For Early Delivery

Pig Iron, Per Gross Ton:	July 6, 1926	June 29, 1926	June 8, 1926	July 7, 1925
No. 2X, Philadelphia‡	$22.26	$22.26	$22.76	$21.26
No. 2, Valley furnace†	17.75	17.75	18.00	18.50
No. 2, Southern, Cin'ti†	24.19	24.19	24.69	22.05
No. 2, Birmingham†	21.00	21.00	21.00	18.00
No. 2 foundry, Chicago*	21.00	21.00	21.00	20.50
Basic, del'd, eastern Pa.	*21.00*	21.25	21.75	21.50
Basic, Valley furnace	18.00	18.00	18.00	18.00
Valley Bessemer del'd P'gh	20.76	20.76	20.76	20.76
Malleable, Chicago*	21.00	21.00	21.00	20.50
Malleable, Valley	17.75	17.75	18.00	18.50
Gray forge, Pittsburgh	19.01	19.01	19.26	19.76
L. S. charcoal, Chicago	29.04	29.04	29.04	29.04
Ferromanganese, furnace	88.00	88.00	88.00	115.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	34.00	34.00	34.00	38.08
Bess. billets, Pittsburgh	35.00	35.00	35.00	35.00
O.-h. billets, Pittsburgh	35.00	35.00	35.00	35.00
O.-h. sheet bars, P'gh	36.00	36.00	36.00	35.00
Forging billets, base, P'gh	40.00	40.00	40.00	40.00
O.-h. billets, Phila	40.30	40.30	40.30	40.30
Wire rods, Pittsburgh	45.00	45.00	45.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb	1.90	1.90	1.90	1.90
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.22	2.22	2.22	2.22
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	2.00	2.00	2.00	2.00
Steel bars, Chicago	2.10	2.10	2.10	2.10
Steel bars, New York	2.34	2.34	2.34	2.34
Tank plates, Pittsburgh	1.90	1.90	1.85	1.90
Tank plates, Chicago	2.10	2.10	2.10	2.10
Tank plates, New York	2.24	2.24	2.24	2.14
Beams, Pittsburgh	2.00	2.00	1.90	2.00
Beams, Chicago	2.10	2.10	2.10	2.10
Beams, New York	2.34	2.34	2.24	2.34
Steel hoops, Pittsburgh	2.50	2.50	2.50	2.40

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	July 6, 1926	June 29, 1926	June 8, 1926	July 7, 1925
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.10	3.10	3.10	3.10
Sheets, black, No. 28, Chicago dist. mill	3.25	3.25	3.25	3.30
Sheets, galv., No. 28, P'gh	4.25	4.25	4.30	4.15
Sheets, galv., No. 28, Chicago dist. mill	4.40	4.40	4.50	4.35
Sheets, blue, 9 & 10, P'gh	2.30	2.30	2.35	2.30
Sheets, blue, 9 & 10, Chicago dist. mill	2.40	2.40	2.40	2.45
Wire nails, Pittsburgh	2.65	2.65	2.65	2.65
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.70
Plain wire, Pittsburgh	2.50	2.50	2.50	2.50
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.55
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.35
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.40	3.40
Tin plate, 100 lb. box, P'gh	$5.50	$5.50	$5.50	$5.50
Old Material, Per Gross Ton:				
Carwheels, Chicago	**$16.50**	$16.00	$15.00	$17.00
Carwheels, Philadelphia	17.00	17.00	17.00	17.00
Heavy steel scrap, P'gh	16.25	16.25	15.50	17.50
Heavy steel scrap, Phila.	15.00	15.00	15.00	15.50
Heavy steel scrap, Ch'go	**14.00**	13.50	12.00	15.50
No. 1 cast, Pittsburgh	15.50	15.50	16.00	17.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	17.50
No. 1 cast, Ch'go (net ton)	**17.00**	16.75	15.75	17.50
No. 1 RR. wrot., Phila.	16.50	16.50	16.50	18.00
No. 1 RR. wrot. Ch'go (net)	13.00	13.00	11.00	14.00
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.90	$2.75
Foundry coke, prompt	4.00	4.00	4.00	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.00	14.00	14.00	14.00
Electrolytic copper, refinery	13.62½	13.62½	13.57½	13.62½
Zinc, St. Louis	**7.22½**	7.17½	7.05	7.10
Zinc, New York	**7.57½**	7.52½	7.40	7.45
Lead, St. Louis	8.00	8.00	7.47½	7.85
Lead, New York	8.25	8.25	7.65	8.10
Tin (Straits), New York	**62.62½**	61.62½	58.75	57.50
Antimony (Asiatic), N. Y.	**14.00**	13.50	11.50	18.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Holiday Causes Little Interruption—Quiet Follows Pig Iron Sales

PITTSBURGH, July 6.—Observance of the holiday has meant considerably less interruption than usual to steel business and the operation of steel plants in this district. Ordinarily, the mid-year period sees some slowing down in business and with some lessening also in the urgency for deliveries. A good deal of capacity goes down for the entire fourth of July week. This year, however, there has been no marked falling off in demand, and except for some sheet-mill capacity, which suspended last Saturday for all of this week, the curtailment of production was closely confined to the holiday itself.

Charging of open-hearth furnaces instead of beginning on Sunday afternoon began on Monday afternoon. A number of steel company blast furnaces also were banked on the holiday, because there is no desire at the moment to accumulate cold pig iron and another reason is that few steel plants have a sufficient number of casting machines to take care of their full blast furnace output. Rolling mill operations stopped as usual at noon on Saturday, but generally resumed Monday night instead of Sunday night.

Except for the loss of one day's production, therefore, the recent rate of plant engagement is maintained and it seems to be the plan of the larger producers to schedule for July at the same rate as for June, which in ingots averaged 70 per cent in this and nearby districts. It is common report that the demand for the hot rolled products over the past week has held up remarkably well, and manufacturers are further encouraged by the fact that the recent advances in prices are holding well.

There seems to have been no interruption in the rise in the demand for sheets, but there is still some irregularity in prices, although some manufacturers think that there is a little more stability now than there was a few weeks ago. There is remarkably brisk demand for pipe and enough business in tin plate to sustain operations at about 80 per cent of capacity for the next 60 days.

Steel products finding their principal outlet to the automotive industry generally are moving with more freedom as the builders get into production on their new models. The movement of wire products leaves something to be desired, but taking the steel market by and large, it is making a remarkably good showing for this time of year. Manufacturers generally feel that as stocks in second hands are moderate, there is no reason why the summer as a whole will not make a favorable comparison with other years.

June sales of pig iron in this district appear to have amounted to between 50,000 and 60,000 tons, mostly of foundry grade, and a quiet market now finds its explanation in the fact that large consumers are covered for the third quarter and in some cases for the remainder of the year.

The scrap market still shows a tendency toward strength, but the reason is in the activity of the dealers, rather than in the demand from consumers. The holiday caused some shortage of blast furnace coke and

some stiffening of prices, but it is probable that easier conditions will be seen before the end of the week.

Pig Iron.—The market here again is very quiet, as is perhaps only natural, seeing that by their large purchases of last month the important consumers, particularly of foundry iron, have covered themselves against their requirements for at least the next three months. Some consumers seem to have bought considerably more iron than is called for by their ordinary requirements, but they no doubt felt safe in large purchases at the prices that lately have prevailed. There is now some tendency on the part of merchant producers to seek a higher price, but except for small tonnages it seems likely that recent sales established levels that are likely to rule for at least the next 90 days. The ordinary quotation on foundry iron is $18, Valley furnace, for No. 2 grade, but the test of that price is lacking, because there is so little demand. Basic iron also is quoted at $18 and sales of small lots are reported at that price. Not much business in standard basic iron appears to have been sold at less than that price and only a custom which appraises basic iron as not worth more than foundry iron warrants a lower quotation. There has been no weakening in the price of Bessemer iron, which holds at $19, Valley furnace, and of which there has been at least one-half of 1000 tons at that price. W. P. Snyder & Co. make the average price of Bessemer iron from Valley furnaces in June $19, as compared with $19.359 in May, and of basic $18, the same price as in May.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$18.00
Bessemer	19.00
Gray forge	$17.25 to 17.50
No. 2 foundry	17.75 to 18.00
No. 3 foundry	17.25 to 17.50
Malleable	17.75 to 18.00
Low phosphorus, copper free	27.50

Ferroalloys.—Based on the maximum tonnages named in third quarter and last half contracts for spiegeleisen, the leading commercial producer is fully obligated for the remainder of the year. This situation naturally gives the market a firm tone, as it suggests caution in the matter of further commitments. Strictly new business in this and other ferroalloys is light, but specifications against contracts still are being made freely. Prices are given on page 109.

Semi-Finished Steel.—The tendency to limit purchases to nearby requirements is as strong among steel manufacturers who buy their steel as it is among consumers of finished steel products, as there has been much less contracting for billets, slabs, and sheet bars for the full quarterly period than usual. There has been no change in prices for the third quarter from those ruling in the first and second quarters, and nothing to suggest either a shortage or an advance in prices, and now integrated manufacturers feel safe in buying from month to month without entering into formal agreements. On the business done so far in this quarter, sheet bars have brought $36; Pittsburgh, with freight equalized with either Youngstown or Cleveland, and for large billets and slabs the price has been $35, Pittsburgh, Youngstown or Cleveland. There is nothing unusual about the recent sale by a Cleveland producer of billets at $35, Pittsburgh; only on one occasion in recent years has that producer been able to sell on other than a Pittsburgh base for delivery into the Pittsburgh district. Wire rods are moving steadily in small lots at unchanged prices. The market also is steady on skelp, but open market sales are very few. Prices are given on page 109.

Wire Products.—There is the same steadiness of demand that recently has marked trading. Consumption is good, as it usually is at this time of year, and as distributers have not been carrying especially big stocks, there is rapid reflection of consumptive demand in the calls of the jobbers upon the mills. As to prices, it is said there is less tendency toward price concessions than was true a short time ago, when the disappointment over the spring demands caused some producers to treat customers gently. Wire mill operations still hover about 50 to 60 per cent of capacity; a higher rate is unnecessary in meeting present demand and maintaining mill stocks. Prices are given on page 107.

Rails and Track Supplies.—Demand for standard rails is of about the usual proportions for this time of year, coming chiefly from the traction lines, with a scattering of fill-in orders from the steam roads. Demand for light rails seems to be somewhat better than it was a short time ago, and there is talk of $36 per gross ton for billet rails as an early possibility. Some makers have more profitable business in other products rolled on the same mills, and are less anxious for light rail business. Spikes and tie plates are moving steadily against old contracts. Prices are given on page 107.

Tubular Goods.—Pipe still stands out as the most active of the finished products. Oil country pipe is especially active, and makers have so much business on their books that their delivery promises on new orders are becoming more extended. On the popular sizes of casing, the best deliveries now range from four to six weeks, as against two weeks or less a short time ago and one week earlier in the year. In standard pipe, deliveries are made more promptly, but generally the manufacturers are in a strong position as to order books, and it is unavailing for jobbers to seek supplies from other than their regular sources in the idea that earlier delivery can be obtained. The price situation naturally reflects the good business that is in progress. Mills still are well engaged on line pipe, and the prospect is good for additional business. Boiler tubes are selling steadily enough, but production has not been adjusted to demand sufficiently to enable producers to secure any higher prices. Discounts are given on page 107.

Tin Plate.—Mills still are occupied at a comparatively high rate, operations being placed at approximately 80 per cent of capacity. Despite the record shipments of the first half of the year, there is no evidence that container manufacturers have overestimated their needs. While it is possible the pack of

THE IRON AGE Composite Prices

Finished Steel

July 6, 1926, 2.431c. Per Lb.

One week ago	2.431c.
One month ago	2.410c.
One year ago	2.431c.
10-year pre-war average	1.689c.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 88 per cent of the United States output of finished steel.

	High		Low	
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	April 24;	2.446c.,	Jan. 2

Pig Iron

July 6, 1926, $19.71 Per Gross Ton

One week ago	$19.71
One month ago	19.79
One year ago	18.96
10-year pre-war average	15.72

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham.

	High		Low	
1926	$21.54,	Jan. 5;	$19.71,	June 29
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	March 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills	2.00c. to 2.10c.
F.o.b. Chicago	2.10c.
Del'd Philadelphia	2.32c.
Del'd New York	2.34c.
Del'd Cleveland	2.19c.
F.o.b. Birmingham	2.15c. to 2.25c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	2.00c. to 2.10c.

Rail Steel

F.o.b. mill	1.80c. to 1.90c.
F.o.b. Chicago	2.00c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	3.00c.
Common iron, del'd Philadelphia	2.22c.
Common iron, del'd New York	2.24c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mill	1.90c. to 2.00c.
F.o.b. Chicago	2.10c.
F.o.b. Birmingham	2.00c. to 2.10c.
Del'd Cleveland	2.09c.
Del'd Philadelphia	2.22c.
Del'd New York	2.24c.
C.i.f. Pacific ports	2.25c. to 2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mill	2.00c. to 2.10c.
F.o.b. Chicago	2.10c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.09c. to 2.19c.
Del'd Philadelphia	2.22c. to 2.32c.
Del'd New York	2.24c. to 2.34c.
C.i.f. Pacific ports	2.30c. to 2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, narrower than 6 in., P'gh	2.50c.
All gages, 6 in. and wider, P'gh	2.30c.
All gages, 6 in. and narrower, Chicago	2.60c.
All gages, wider than 6 in., Chicago	2.50c.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.50c.
Bars, f.o.b. Chicago	2.50c.
Bars, Cleveland	2.55c.
Shafting, ground, f.o.b. mill	*2.70c. to 3.00c.
Strips, f.o.b. Pittsburgh mills	3.60c. to 3.75c.
Strips, f.o.b. Cleveland mills	3.60c.
Strips, delivered Chicago	3.90c. to 4.05c.
Strips, f.o.b. Worcester mills	4.05c.

*According to size.

Wire Products

(To jobbers in car lots f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.65
Galv'd nails, 1-in. and longer	4.65
Galv'd nails, shorter than 1 in.	4.90
Galvanized staples	3.35
Polished staples	3.10
Cement coated nails	2.65

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.30c.
Nos. 9 and 10, f.o.b. Ch'go dist. mills,	2.40c. to 2.45c.
Nos. 9 and 10, del'd Philadelphia	2.62c to 2.72c.

Box Annealed, One Pass Cold Rolled

No. 28, f.o.b. Pittsburgh	3.10c. to 3.15c.
No. 28, f.o.b. Ch'go dist. mill	3.25c. to 3.30c.
No. 28, del'd Philadelphia	3.32c. to 3.47c.

Galvanized

No. 28, f.o.b. Pittsburgh	4.20c. to 4.30c.
No. 28, f.o.b. Chicago dist. mills	4.40c. to 4.45c.
No. 28, del'd Philadelphia	4.62c. to 4.72c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.15c.
No. 28, f.o.b. Chicago dist. mill	3.25c.

Automobile Body Sheets

No. 22, f.o.b. Pittsburgh	4.20c.

Long Ternes

No. 28, 8-lb. coating, f.o.b. mill	4.75c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.60

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.40
8-lb. coating I.C.	11.70
15-lb. coating I.C.	14.85
20-lb. coating I.C.	$16.20
25-lb. coating I.C.	17.90
30-lb. coating I.C.	19.45
40-lb. coating I.C.	21.65

Alloy Steel Bars

(F.o.b. Pittsburgh or Chicago)

S. A. E. Series Numbers		Base Per 100 Lb.
21.00*	(½% Nickel, 0.10% to 0.20% Carbon)	$3.20 to $3.25
23.00	(3½% Nickel)	4.40 to 4.50
2500	(5% Nickel)	5.50 to 5.65
3100	(Nickel Chromium)	3.40 to 3.50
3200	(Nickel Chromium)	5.00 to 5.25
3300	(Nickel Chromium)	7.00 to 7.25
3400	(Nickel Chromium)	6.25 to 6.50
5100	(Chromium Steel)	3.40 to 3.50
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.30
6100	(Chrom. Vanad. spring steel)	3.80
9250	(Silicon Manganese spring steel)	3.20 to 3.25
	Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)	4.10 to 4.20
	Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.30
	Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)	4.25 to 4.35
	Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	3.40 to 3.50
	Chromium Molybdenum spring steel (1 — 1.25 Chrom., 0.30 — 0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½-in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specifications, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	$34.00 to 35.00
Light (from rail steel), f.o.b. mill	32.00 to 33.00
Light (from billets), f.o.b. Ch'go mill	$36.00 to 38.00

Track Equipment

(F.o.b. Mill)

	Base Per 100 Lb.
Spikes, ⅝ in. and larger	$2.80 to $3.00
Spikes, ½ in. and smaller	2.90 to 3.25
Spikes, boat and barge	3.25
Track bolts, all sizes	3.90 to 4.50
Tie plates, steel	2.25 to 2.85
Angle bars	2.75

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	⅛ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	12
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	⅛ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	7
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 5 to 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	34	3¼ and 3½ in.	50
2½ and 2¾ in.	42	4 in.	53
3 in.	48	4½, 5 and 6 in.	48

Less carloads, 4 points less. Add $3 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercially exact lengths. Warehouse discounts on small lots are less than the above.

fruits and vegetables will be smaller in the Central and Eastern sections of the country, due to the backwardness of the spring, the Pacific Coast pack is exceptionally heavy. General line tin plate is holding up well in demand and there is a lively export demand, due to the enforced curtailment of production by British mills.

Cold-Finished Steel Bars and Shafting.—Automobile companies are getting into production on their new models and making larger demands upon the parts makers, who in turn are specifying more freely for raw material. It is in the number of orders rather than in their sizes that improvement in the demand for cold-finished steel bars is observed, although there are occasional orders of fair size. Prices are very steady on a basis of 2.50c., Pittsburgh, for ordinary tonnages.

Hot-Rolled Flats.—Cooperage demands for hoops, as usual at this time of year, are running fairly heavy. Bands are selling steadily, but sales lack volume. In strips, individual sales run heavily to small lots, but totals are swelled by the fact that orders are more numerous than they were in late May and early June.

Cotton Ties.—Opening of books by makers for this year's cotton ties is likely in the next few days. There is considerable secrecy as to prices, but the common impression is that they will be again based at Atlantic and Gulf ports, and that they will not be materially different from those of a year ago, or $1.28 per bundle of 45 lb., f.o.b. Atlantic ports and $1.25, f.o.b. Gulf ports.

Bolts, Nuts and Rivets.—Orders for bolts and nuts are coming to makers here in very steady fashion; there is no anticipation of requirements, and manufacturers must carry stocks to meet the delivery requirements accompanying most orders. Prices are steady. The regular contract price on large rivets is $2.60 per 100 lb., but that figure is being shaded 10c. to 15c. per 100 lb. on desirable orders for early delivery. Prices and discounts are given on page 109.

Plates.—There is close observance of 1.90c., base, Pittsburgh, as a minimum on plates, although the demand, in the lack of railroad car business, is not taxing productive capacity. River barges are providing a fair amount of tonnage with about 2400 tons embraced in an order for 16 barges for the Upper Mississippi barge line which will be placed shortly. There is prospect of a good tonnage of plates in two projected gas pipe lines going east and west of the Amarillo, Tex., field.

Cold-Rolled Strips.—Makers in this district still are holding to 3.75c., base, Pittsburgh or Cleveland, for small lots, but find that on attractive tonnages they have to go to 3.65c. and even 3.60c. Bookings are showing some increase due to larger operations by the automotive industry.

Steel and Iron Bars.—Mills in this district report a sustained demand for steel bars and that the past week's orders and specifications have been surprisingly good for a period usually marked by quietness. Evidence is lacking that 2c., base, Pittsburgh, has entirely disappeared as a carload lot price, but the claim is made that such lots are going at 2.10c. Rail steel bars are selling steadily at from 1.80c. to 2c., base, mill. There is only a fair demand for iron bars, owing to the lack of large railroad car buying, and 3c., base, Pittsburgh, for refined bars is subject to some shading.

Structural Steel.—Demand is holding up very well, according to reports of mills in this district, and on new business 2c., base, Pittsburgh, for large shapes is closely adhered to. Fabricating companies that have recently tested the market report the mills as very firm.

Sheets.—Orders, notably for automobile sheets, are holding up in good fashion and prices remain the sole source of dissatisfaction, although there has been some improvement in that direction in that shading is by fewer producers than was true recently. On galvanized sheets 4.25c., base, Pittsburgh, still is acceptable to two or three mills, but as the American Sheet & Tin Plate Co. reports sales at 4.30c., this would tend to prove that the lower price was not a common one. That company also has been getting black sheet business at 3.15c., base, Pittsburgh, which would be difficult or impossible if the ruling market was under 3.10c., but there have been recent sales of heavy gage black sheets at 3c., some mills being more anxious for business of that sort than in the lighter gages. Blue annealed is reasonably firm and there are no suggestions that less than 4.20c., base, is being done on automobile body sheets.

Coke and Coal.—Curtailment of beehive oven coke production on account of the holiday has given the market temporary firmness and pig iron producers, anxious to have ample supplies over the holiday, have paid slightly higher prices than recently prevailed. Sales are reported of spot furnace coke as high as $3, but the market today is quotable at $2.75 to $2.80 per net ton at ovens. There does not seem to have been any shortage of spot foundry coke, and there has been no change in prices. The demand for coal is no tax upon the supply and prices are easy at recent ranges.

Old Material.—While heavy melting steel recently sold at $17, and that price still is obtainable on strictly No. 1 railroad scrap or its equivalent, there is no occasion to revise prices for the general run of offerings of that grade. There is no widespread mill demand, and $16.50 appears to be all that can be secured from consumers, while dealers with short contracts are bidding $16.25 to $16.50 to cover them, and there is a bid of $16.75 for shipment to one Pittsburgh district point. The market is stronger on the blast furnace grades of scrap, with sales noted as high as $12.75. Rerolling rails, after selling down to $16 early in June, have grown stronger and $16.50 now appears to be low, as they are available at any of the points mentioned, while $17 recently was done at a mill with rather exacting specifications. The July scrap list of the Pennsylvania Railroad offers more than 40,000 net tons and that of the Baltimore & Ohio, 23,855 gross tons.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Tank plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforced steel bars	2.90c.
Black sheets (No. 28 gage), 25 or more bundles	4.00c.
Galvanized sheets (No. 28 gage), 25 or more bundles	5.05c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.55c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Spikes, large	3.30c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Bolts, track	4.90c.
Wire, black soft annealed, base per 100 lb.	$3.00
Wire, galvanized soft, base per 100 lb.	3.00
Common wire nails, per keg	3.00
Cement coated nails	3.05

We quote for delivery to consumer's mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton

Heavy melting steel	$16.25 to $16.75
No. 1 cast, cupola size	15.50 to 16.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	16.50 to 17.00
Compressed sheet steel	15.00 to 15.50
Bundled sheets, sides and ends	14.00 to 14.50
Railroad knuckles and couplers	18.00 to 18.50
Railroad coil and leaf springs	18.00 to 18.50
Low phosphorus blooms and billet ends	20.50 to 21.00
Low phosphorus mill plates	20.00 to 20.50
Low phosphorus miscellaneous	18.50 to 19.00
Low phosphorus punchings	18.50 to 19.00
Steel car axles	20.50 to 21.00
Cast iron wheels	16.50 to 17.00
Rolled steel wheels	18.00 to 18.50
Machine shop turnings	11.00 to 11.50
Short shoveling turnings	12.50 to 12.75
Sheet bar crops	18.00 to 19.00
Heavy steel axle turnings	15.00 to 15.50
Short mixed borings and turnings	12.50 to 12.75
Heavy breakable cast	14.00 to 14.50
Cast iron borings	12.50 to 12.75
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	16.25 to 16.75
Railroad or automobile malleable scrap	17.00 to 17.50

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F. o. b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rolling, 4-in. and over	$35.00
Rolling, 2-in. and smaller	36.00
Forging, ordinary	40.00
Forging, guaranteed	45.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$36.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$35.00
6 in. x 2 in. and smaller	36.00

Skelp

	Per Lb.
Grooved	1.90c.
Sheared	1.90c.
Universal	1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$45.00
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

*Chicago mill base is $46. Cleveland mill base, $45.

Prices of Raw Materials

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	9.50c. to 10c.
Iron ore, Swedish, average 66% iron	9.50c.
Manganese ore, washed, 51% manganese, from the Caucasus	42c.
Manganese ore, Brazilian or Indian, nominal	42c. to 44c.
Tungsten ore, high grade, per unit, in 60% concentrates	$11.25 to $12.00
	Per Ton
Chrome ore, Indian basic, 48% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $23.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	55c. to 60c.

Coke

	Per Net Ton	
Furnace, f.o.b. Connellsville prompt	$2.75 to	$2.85
Foundry, f.o.b. Connellsville prompt	4.00 to	4.50
Foundry, by-product, Ch'go ovens		9.75
Foundry, by-product, New England, del'd		12.00
Foundry, by-product, Newark or Jersey City, delivered	9.75 to	10.77
Foundry, Birmingham	5.50 to	6.00
Foundry, by-product, St. Louis or Granite City		10.00

Coal

	Per Net Ton	
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to	$1.90
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to	1.75
Mine run gas coal, f.o.b. Pa. mines	1.90 to	2.10
Steam slack, f.o.b. W. Pa. mines		1.25
Gas slack, f.o.b. W. Pa. mines	1.25 to	1.35

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.	$88.00 to $95.00
Foreign, 80%, Atlantic or Gulf port, duty paid	88.00

Spiegleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$32.00 to $34.00
Domestic, 16 to 19%	31.00 to 33.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$85.00 to $87.50
75%	145.00 to 150.00

Per Gross Ton Furnace		*Per Gross Ton Furnace*	
10%	$42.00	12%	$42.00
11%	42.00	14 to 16%	$45 to 46.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10%	$33.00	12%	$37.00
11%	35.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6%	$25.50	10%	$31.00
7%	26.50	11%	33.00
8%	27.50	12%	35.00
9%	29.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	$1.05 to $1.20
Ferrochromium, 4% carbon and up, 60 to 70% Cr., per lb. contained Cr. delivered	11.50c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.25 to $4.00
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid,	$17.50 to $17.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 f.o.b. Works	
	High Duty	Moderate Duty
Pennsylvania	$40.00 to $43.00	$38.00 to $40.00
Maryland	43.00 to 46.00	38.00 to 40.00
New Jersey	55.00 to 75.00	
Ohio	40.00 to 43.00	38.00 to 40.00
Kentucky	40.00 to 43.00	38.00 to 40.00
Illinois	40.00 to 43.00	35.00 to 38.00
Missouri	40.00 to 43.00	35.00 to 38.00
Ground fire clay, per ton	6.50 to	7.50

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$40.00
Chicago	49.00
Birmingham	50.00
Silica clay, per ton	$8.00 to 9.00

Magnesite Brick

	Per Net Ton
Standard size, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00 to $48.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

(Less-than-Carload Lots)

(F.o.b. Pittsburgh, Cleveland, Birmingham and Chicago)

	Per Cent Off List
Machine bolts, small, rolled threads	60 and 10
Machine bolts, all sizes, cut threads	50, 10 and 10
Carriage bolts, smaller and shorter, rolled threads	50, 10 and 10
Carriage bolts, cut threads, all sizes	50 and 10
Eagle carriage bolts	65 and 10
Lag bolts	60, 10 and 10
Plow bolts, Nos. 3 and 7 heads	50 and 10
(Extra of 20% for other style heads)	
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,	45, 10 and 5
Larger and longer sizes	45, 10 and 5
Bolt ends with hot-pressed nuts	50, 10 and 10
Bolt ends with cold-pressed nuts	45, 10 and 5
Hot-pressed nuts, blank and tapped, square,	4.00c. per lb. off list
Hot-pressed nuts, blank or tapped, hexagons,	4.40c. per lb. off list
C.p.c. and t. square or hex. nuts, blank or tapped	4.10c. per lb. off list
Washers*	6.50c. to 6.25c. per lb. off list

*F.o.b. Chicago and Pittsburgh.

The discount on machine, carriage and lag bolts is 5 per cent more than above for car lots. On hot-pressed and cold-punched nuts the discount is 25c. more per 100 lb. than quoted above for car lots.

Bolts and Nuts

(Quoted with actual freight allowed up to but not exceeding 50c. per 100 lb.)

	Per Cent Off List
Semi-finished hexagon nuts:	
⅞ in. and smaller, U. S. S.	80, 10 and 5
⅞ in. and larger, U. S. S.	75, 10 and 5
Small sizes, S. A. E.	80, 10, 10 and 5
S. A. E., ⅝ in. and larger	75, 10, 10 and 5
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60 and 5

Semi-Finished Castellated and Slotted Nuts

(Actual freight allowed up to but not exceeding 50c. per 100 lb.)

(To jobbers and consumers in large quantities)

	Per 100 Net S.A.E.	Per 100 Net U.S.S.		Per 100 Net S.A.E.	Per 100 Net U.S.S.
¼-in.	$0.44	$0.44	⅝-in.	$2.35	$2.40
5/16-in.	0.515	0.515	¾-in.	3.60	3.60
⅜-in.	0.62	0.66	⅞-in.	5.65	5.80
7/16-in.	0.79	0.90	1-in.	8.90	8.90
½-in.	1.01	1.05	1⅛-in.	12.60	13.10
9/16-in.	1.38	1.42	1¼-in.	18.35	18.35
⅝-in.	1.70	1.73	1½-in.	21.00	21.00

Larger sizes.—Prices on application.

Large Rivets

	Base Per 100 Lb.
F.o.b. Pittsburgh	$2.50 to $2.60
F.o.b. Cleveland	2.70
F.o.b. Chicago	2.75

Small Rivets

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70, 10 and 5 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb.)

	Per Cent Off List
Milled cap screws	80 and 10
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U. S. S. thread,	80, 10 and 10
Upset hex. cap screws, S.A.E. thread,	80, 10 and 10
Upset set screws	80, 10 and 5
Milled studs	70 and 5

Chicago

Another Week of Heavy Pig Iron Buying —Steel Output Maintained

CHICAGO, July 6.—In another week of heavy pig iron buying, close to 100,000 tons was contracted for, raising the total sales for the recent buying movement to approximately 350,000 tons. Thus far, at any rate, the active demand for merchant iron has failed to strengthen prices.

Sales and specifications of the heavier rolled steel products are slightly heavier than a week ago and substantially equal to the average for the past six weeks. Mill output remains at about 90 per cent of capacity, although yesterday the holiday was observed by a rather general suspension of operations, except in the continuous departments. Steel works blast furnace operations also are unchanged.

Among the consuming industries the farm implement makers are commencing to specify more liberally as they start their fall production programs. The agricultural outlook, however, is still somewhat uncertain, and reports from sections in the Missouri River basin in the Northwest indicate that business has been adversely affected by reduced farmer buying. The reappearance of the agrarian problem in politics is also cause for concern. In fact, it is felt that no effort will be spared by industrial leaders to put business on as satisfactory a footing as possible before the coming November elections. At present railroad car buying is almost totally lacking, but it is believed that important equipment programs are now in preparation. It is also understood that the railroads will place large orders for rails and track supplies for 1927 and that some of this tonnage will be released for fall and winter rolling, to insure deliveries in time for spring track laying. This year the roads were handicapped because their demands on the mills were too concentrated. Pressure for the delivery of rails and fastenings is still heavy, considering the advanced season. The output of the Gary mill last week was 16,000 tons as compared with an average of 18,000 tons a week earlier in the year.

For most rolled products prices are steady. Sheets and cold rolled strip steel are conspicuous because of their weakness.

Ferroalloys.—A down State consumer is inquiring for 700 tons of spiegeleisen.

We quote 80 per cent ferromanganese, $95.56, delivered Chicago; 50 per cent ferrosilicon, $85, delivered; spiegeleisen, 18 to 22 per cent, $39.76 to $41.76, delivered Chicago.

Sheets.—Demand for sheets continues to drag, and prices are soft, although no lower quotations than those heretofore recorded have been reported.

Chicago delivered prices from mill are 3.30c. for No. 28 black; 2.45c. to 2.50c. for No. 10 blue annealed; 4.45c. to 4.50c. for No. 28 galvanized. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Pig Iron.—Sales of close to 100,000 tons were made during the past week, making a total of about 350,000 tons sold since the current buying movement began. It is estimated that fully one-half of the iron bought for forward delivery is for shipment through the entire last half. Demand, if not quite so active as heretofore, is still of generous proportions. Pending inquiry totals more than 25,000 tons. Notwithstanding the heavy buying, prices fail to show any signs of advancing. In fact, the market appears to have settled rather generally to a single price of $21, base, furnace, for malleable and foundry grades, although occasional spot tonnages are held at $21.50. Locally a number of sales of steel works iron are reported, and at Milwaukee the Thomas furnace has blown in, having produced its first cast yesterday. Wisconsin furnaces, it is understood, are now quoting $21, furnace, giving buyers in that State the advantage of the difference between the freight rates direct from those stacks and the freight rate from Chicago. In few instances, however, does this advantage amount to more than 50c. a ton. A number of moderate-sized sales of Southern iron have been made for barge and rail shipment at $25.18 delivered.

Quotations on Northern foundry high phosphorus and malleable iron are f.o.b. local furnace, and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards:

Northern No. 2 foundry, sil. 1.75 to 2.25	$21.00
Northern No. 1 foundry, sil. 2.25 to 2.75	21.50
Malleable, not over 2.25 sil.	21.00
High phosphorus	21.00 to 21.50
Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	29.04
Southern No. 2 (all rail)	27.01
Southern No. 2 (barge and rail)	25.18
Low phos., sil. 1 to 2 per cent, copper free	29.50 to 30.00
Silvery, sil. 8 per cent	32.29
Bessemer ferrosilicon, 14 to 15 per cent	45.79

Reinforcing Bars.—Lettings during the week were heavy, totaling 4300 tons. The lion's share of the business went to distributers of rail steel. For awards and inquiries see page 115.

Plates.—Generous specifications continue to come from railroad car builders, but in the absence of fresh car business a sharp decline in the tonnage rolled for equipment construction is in sight. In fact, deliveries on universal mill plates have improved materially. At least one producer of sheared plates, however, is still well booked ahead. Although no new inquiries for oil storage tanks are reported, a local mill has taken orders for 2600 tons of plates for tank work in the Texas Panhandle district. Mill prices of plates have not undergone a severe test, although technically they are somewhat easier.

The mill quotation on plates is 2.10c. per lb., base, Chicago.

Structural Material.—There are fewer fresh inquiries, and the number of structural lettings has declined. Mills, however, are well booked ahead on plain material, and fabricating shops are busy.

The mill quotation on plain material is 2.10c. per lb. base, Chicago.

Bars.—An unusual amount of fresh inquiry for soft steel bars has appeared. The mails since July 1 have been more productive of prospective business than has been the case at this season for a number of years. Both sales and specifications are slightly heavier than last week and equal the average for the past six weeks. There is a tendency on the part of automobile parts makers to specify less freely, but this is by no means pronounced. Releases from other customers are large, particularly from reinforcing bar dealers. Farm machinery makers are also taking more steel. A number of the important manufacturers of tillage tools plan to start their fall production programs shortly after the holiday. Jobbers are specifying liberally. Prices have undergone no real test since the recent advance. Bar iron specifications are of the usual proportions, and buying is in fair volume, with the price situation unchanged. Rail steel bar mills are profiting by a large current demand for reinforcing steel. Probably 50 per cent of the reinforcement steel bought in this city is rail steel. Heavier releases from the implement makers have also come to the hard steel bar mills. Prices show no change, with 2c., Chicago, ruling for local shipment and 1.90c., mill, for delivery in some of the outside districts.

Wire Products.—The market appears best by comparison with last year. Merchant sales in June were 20 per cent heavier than in the same month of 1925. Demand, however, is far from heavy, and does not exceed the current rate of output, which ranges from 50 to 60 per cent. Prices are unchanged, as shown on page 107.

Rails and Track Supplies.—Because of the difficulties experienced by the railroads this year in obtaining deliveries of rails and fastenings early enough for

spring laying, it is intimated that they may take some tonnage in the coming fall and winter months for use next year. If this proves to be the case, the usual fall buying movement may set in within the next month or two. The carriers are said to be contemplating heavy budgets for 1927. An unusual number of small orders for rails, ranging from 800 tons to 1500 tons each, were placed during the week. Some of these came from small lines, while others were repeat orders from such roads as the Pennsylvania, New York Central and Baltimore & Ohio, which found that they required a little more tonnage than they had contracted for. The amount of this business placed here totaled 10,000 tons.

Standard Bessemer and open-hearth rails, $43; light rails, rolled from billets, $36 to $38 per gross ton, f.o.b. maker's mill.

Standard railroad spikes, 2.90c. per lb. mill; track bolts with square nuts, 3.90c. mill; steel tie plates, 2.25c. to 2.35c. mill; angle bars, 2.75c. mill.

Cold-Rolled Strip.—The weakness of prices at Cleveland and Pittsburgh has been reflected here, and strip steel now ranges from 3.90c. to 4.05c. delivered, Chicago.

Warehouse Business.—Final returns for June indicate that, as a whole, business booked by local jobbers during June was about on a par with that taken during May. Sales during the first six months of this year, however, showed a gain over those for the first half of 1925, although not equal to bookings in the last six months of last year.

Bolts, Nuts and Rivets.—Bolt and nut makers are receiving better specifications from the farm implement industry, but somewhat less tonnage from the automotive plants. Discounts are holding. Demand for rivets is satisfactory. In fact, a representative local producer of small rivets is operating at 100 per cent of capacity. For discounts and prices, see page 109.

Cast Iron Pipe.—New demand is light, and prices show no signs of strengthening. Municipal buying usually falls off in mid-summer, and public utilities confine their purchases largely to the winter months. Pipe shops are better booked in small than in large diameters, and this situation is reflected in prices. As high as $41.50, base Birmingham, is still obtained for diameters under 12 in., but on larger sizes lower prices are available. On 650 tons of 16-in. Class C pipe, on which Milwaukee took bids June 29, the Glamorgan Pipe & Foundry Co. was low bidder with a tender of $47.50, delivered, which is the equivalent of $39, Birmingham. Lettings include:

Milwaukee, 1135 tons of 30-in. and 418 tons of 24-in. Class C, to United States Cast Iron Pipe & Foundry Co.; 40 tons of 16-in. fittings to American Cast Iron Pipe Co.

Milton, Ind., 160 tons of 4, 6 and 8-in. Class B, to the McWane Cast Iron Pipe Co.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Mild steel bars	3.00c.
Reinforcing bars, billet steel	2.60c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Hoops	4.15c.
Bands	3.65c.
No. 28 black sheets	4.10c.
No. 10 blue annealed sheets	3.50c.
No. 28 galvanized sheets	5.25c.
Standard railroad spikes	3.55c.
Track bolts	4.55c.
Structural rivets	3.50c.
Boiler rivets	3.70c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	47½
Coach or lag screws	55 and 5
Hot-pressed nuts, square, tapped or blank,	3.25c. off per lb.
Hot-pressed nuts, hexagons, tapped or blank,	3.75c. off per lb.
No. 8 black annealed wire, per 100 lb	$3.30
Common wire nails, base, per keg	3.05
Cement coated nails, base, per keg	3.05

Pending work includes:

St. Paul, Minn., 350 tons of 4 and 6-in. Class B, bids to be in, July 6.

Fostoria, Ohio, 90 tons of 6-in. and 25 tons of 8-in. Class C, July 12.

We quote per net ton, delivered Chicago, as follows: Water pipe, 4-in., $52.20 to $53.70; 6-in. and over, $48.20 to $49.70; Class A and gas pipe, $4 extra.

Old Material.—An independent steel interest has bought from 10,000 tons to 15,000 tons of heavy melting steel at $14, delivered. Consumers in general are showing more interest in the market and are buying material at advancing prices. Dealers, in the belief that the market is on the upswing, are more disposed to buy than to sell. Competition among them for railroad offerings is keen, and in most cases the prices paid the carriers are above the current market level. Increased pressure for deliveries on the part of a number of important scrap users indicates that old material stocks have been permitted to run low. Most grades of scrap quoted below are 50c. higher than a week ago. The Pennsylvania system will take bids on 50,000 tons July 7, and the Santa Fe offers 3300 tons on the same date.

We quote delivered in consumers' yards, Chicago and vicinity, all freight and transfer charges paid for all items except relaying rails, including angle bars to match, which are quoted f.o.b. dealers' yards:

Per Gross Ton	
Heavy melting steel	$14.00 to $14.50
Frogs, switches and guards, cut apart, and miscellaneous rails	15.00 to 15.50
Shoveling steel	13.75 to 14.25
Hydraulic compressed sheets	12.00 to 12.50
Drop forge flashings	9.50 to 10.00
Forged, cast and rolled steel car wheels	18.00 to 18.50
Railroad tires, charging box size	18.50 to 19.00
Railroad leaf springs, cut apart	18.00 to 18.50
Steel couplers and knuckles	17.00 to 17.50
Coil springs	18.50 to 19.00
Low phos. punchings	17.00 to 17.50
Axle turnings, foundry grade	14.50 to 15.00
Axle turnings, blast fur. grade	12.50 to 13.00
Relaying rails, 56 to 60 lb	25.00 to 26.00
Relaying rails, 65 lb. and heavier	26.00 to 31.00
Rerolling rails	17.25 to 17.75
Steel rails, less than 3 ft	17.00 to 17.50
Iron rails	14.50 to 15.00
Cast iron borings	11.00 to 11.50
Short shoveling turnings	11.00 to 11.50
Machine shop turnings	7.50 to 8.00
Railroad malleable	17.50 to 18.00
Agricultural malleable	16.00 to 16.50
Angle bars, steel	16.00 to 16.50
Cast iron car wheels	16.50 to 17.00
Per Net Ton	
No. 1 machinery cast	17.00 to 17.50
No. 1 railroad cast	16.50 to 17.00
No. 1 agricultural cast	16.50 to 17.00
Stove plate	14.00 to 14.50
Grate bars	14.00 to 14.50
Brake shoes	13.50 to 14.00
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms	19.50 to 20.00
Iron car axles	24.50 to 25.00
Steel car axles	17.50 to 18.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	12.50 to 13.00
No. 1 busheling	10.50 to 11.00
No. 2 busheling	6.50 to 7.00
Locomotive tires, smooth	17.00 to 17.50
Pipes and flues	9.50 to 10.00

Turbo-Generator of 160,000 Kw. Capacity

Continuous load capacity of no less than 160,000 kw., or about 215,000 hp., is the rating of a new turbo-generator ordered by the United Electric Light & Power Co., New York, of the American Brown-Boveri Electric Corporation, Camden, N. J. This rating is three times that of the largest hydraulic turbo-generators of the Niagara Falls Power Co. The heaviest single piece in the new unit will weigh 330,000 lb. Its capacity would light 1,000,000 homes. Cooling water to the extent of 6,000,000 gal. per hr. will be required. This represents the flow of the Delaware River at Port Jervis. It will take nearly two years to build and install this unit and accessories.

Cleveland

A Week of 170,000 Tons of Pig Iron—Heavy Steel Specifications

CLEVELAND, July 6.—Specifications for finished iron and steel were heavy the past week. Some of the mills advised their customers that second quarter contracts would not be extended into July and this announcement brought out a large number of specifications that practically cleaned up the tonnage on expiring contracts. Although a lull is looked for during the summer months, sentiment in the steel industry is much better than a few weeks ago. Two Lake freighters, each requiring 5000 tons of plates, were placed with the American Ship Building Co.; one was purchased by the Inland Steamship Co., Chicago, but the name of the interest ordering the second boat has not yet been made known. The Inland Steel Co. will furnish part of the steel for the boat of its allied company and the Carnegie Steel Co. will supply the remainder as well as all the steel for the second boat. The Nickel Plate and Wheeling & Lake Erie railroads will supplement their early season rail buying with additional rail purchases shortly. The market generally is firm. Steel bars are holding at 2c., Pittsburgh, with mills asking 2.10c. for small lots. All mills are now holding to 2c. for structural shapes and to 1.90c. for plates. Some third quarter plate contracts are being placed.

Pig Iron.—Heavy buying of foundry and malleable iron continued the past week with sales by Cleveland interests aggregating 170,000 tons as compared with 200,000 tons the previous week. While considerable inquiry is still pending, the market is expected to quiet down this week as most consumers are covered with third quarter contracts. Many have bought for the entire last half and some foundries that had previously bought only for the third quarter are now inquiring for the last quarter. Among fourth quarter inquiries is one from the General Electric Co. for its Erie, Pa., works. The Westinghouse Electric & Mfg. Co. divided around 1200 tons for its Cleveland plant between two local producers. Several other lots were placed by Cleveland consumers. The market is slightly firmer in Cleveland for outside shipment, some business having been taken at $18.50 furnace, evidently for shipment to points having a freight advantage over the Valley, but for local delivery the price is unchanged at $19, furnace. In the Valley district a $17.75 quotation is still appearing although most producers are asking $18 to $18.50. In Michigan the market is unchanged at $19 to $19.50 and buying has subsided in that State. The McKinney Steel Co. will blow in its Genesee furnace at Charlotte, N. Y., about Aug. 1.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6.01 from Birmingham:

Basic, Valley furnace	$18.00
N'th'n No. 2 fdy., sil. 1.75 to 2.25	19.50
Southern fdy., sil. 1.75 to 2.25...$26.51 to	27.01
Malleable	19.50
Ohio silvery, 8 per cent	30.52
Standard low phos., Valley furnace	27.50

Iron Ore.—Shipments of Lake Superior ore during June showed a heavy gain over May and amounted to 8,770,493 tons. This is more ore than was shipped in any one month last year. The amount shipped in June showed a gain of 812,007 tons over June last year, when the movement was 7,958,486 tons. Total shipments up to July 1 were 14,893,138 tons, as compared with 18,393,185 tons. These figures show a decrease of 3,500,047 tons in the movement up to July 1, as compared with last year. This is due to the late start in the opening of the season's navigation, caused by ice conditions. Practically all the Lake vessels are in operation and the July movement will probably show considerable gain over June. It is not expected that the Lake fleet will have much difficulty in catching up on shipments before the end of the season.

Alloy Steel.—Competition for business is very keen and some price shading is being done. A leading automobile company is understood to have covered for 6000 tons for the last half at a price concession.

Semi-Finished Steel.—Specifications have been lighter than usual the past week or two due to the shutting down of some of the steel mills over the holidays. Buying is in rather limited volume and not many consumers are covered for the third quarter. Prices are unchanged at $36, Cleveland and Youngstown, for sheet bars and $35 for slabs and large billets.

Sheets.—Demand shows some gain but consumers as a rule are buying in small lots and few third-quarter contracts are being placed. The market is firmer than recently except on galvanized sheets, which are weak. These are being more commonly quoted at 4.25c., Pittsburgh, and there are reports of 4.15c. While 3c. has not disappeared on black sheets, some of the mills are finding it easier to take orders at 3.15c. than a few weeks ago. Blue annealed sheets are firm at 2.30c.

Cold Rolled Strip Steel.—Mills are getting a fair volume of specifications but are not filled up far ahead. The market is well established at 3.60c., Cleveland, and the 3.75c. price for small lots has about disappeared.

Bolts, Nuts and Rivets.—Most consumers have placed third quarter contracts for bolts and nuts. New demand is fair, but large bolts are not moving so well as small bolts. Manufacturers state that there has been a decline in the use of large bolts because concrete and reinforced steel construction, which does not require bolts, has to considerable extent taken the place of timber construction in certain lines of construction work, and also that with the modern type of freight cars fewer bolts are used in their construction than formerly. Bolt and nut manufacturers are operating at 65 to 75 per cent. Rivet specifications are fair.

Reinforcing Bars.—Small lots are in good demand but inquiry for round lots has fallen off. Inquiry includes 500 tons for an unnamed job in Roanoke, Va. Billet steel bars range from 1.90c. to 2c., Pittsburgh. Rail steel bars are firmer with a range of 1.80c. to 1.90c., mill.

Warehouse Business.—Galvanized sheets are irregular with a price of 4.70c. appearing, although some jobbers are holding to 5c. Warehouse business fell off the past week.

Coke.—The demand for foundry coke shows a little more life, but not many contracts are being placed for the third quarter. One maker of a premium grade of Connellsville foundry coke has reduced its price 50 cents a ton. The general price range is $4 to $5, although some coke is being offered at $3.75. Ohio by-product foundry coke is quoted at $7.50 for July shipment.

Old Material.—The market is somewhat firmer and heavy melting steel, borings and turnings and machine shop turnings are 25 cents a ton higher. With the better prices, scrap is coming out more freely than a week ago. The heavy buying in pig iron is having a sentimental effect on dealers, but consumers show no inclination to buy and most of them still have good stocks. A Cleveland dealer sold 2000 tons of heavy melting steel to a western Pennsylvania mill. Dealers are paying $14.25 for heavy melting steel, $11.50 for borings and turnings and $10.25 for machine shop turnings. Some of the borings and turnings sold by Detroit automobile

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Mild steel bars	3.00c.
Cold-finished rounds and hexagons	3.90c.
Cold-finished flats and squares	4.40c.
Hoops and bands	3.65c.
No. 28 black sheets	3.85c.
No. 10 blue annealed sheets	3.15c.
No. 28 galvanized sheets	5.00c.
No. 9 annealed wire, per 100 lb	$3.00
No. 9 galvanized wire, per 100 lb	3.45
Common wire nails, base, per keg	3.00

companies the past week brought $9.35 and machine shop turnings about $8.15.

We quote per gross ton delivered consumers' yards in Cleveland:

Heavy melting steel	$14.25 to $14.50
Rails for rolling	16.25 to 16.50
Rails under 3 ft	17.00 to 17.50
Low phosphorus billet, bloom and slab crops	18.00 to 18.50
Low phosphorus sheet bar crops	18.00 to 18.75
Low phosphorus plate scrap	18.00
Light plate scrap	17.50
Low phosphorus forging crops	16.75 to 17.25
Cast iron borings	11.25 to 11.50
Machine shop turnings	10.00 to 10.50
Mixed borings and short turnings	11.25 to 11.50
Compressed sheet steel	13.00 to 13.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.75 to 14.25
Railroad malleable	18.00 to 18.50
Light bundled sheet stampings	11.00 to 11.50
Steel axle turnings	12.50 to 13.00
No. 1 cast	16.50 to 17.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.75 to 11.25
Drop forge flashings, 15 in. and under	11.50 to 12.00
Railroad grate bars	12.50 to 13.00
Stove plate	11.50 to 12.00
Pipes and flues	10.00 to 10.50

New York

Pig Iron Activity Continues — Steel Buyers Covered for Third Quarter

NEW YORK, July 6.—The pig iron market enters July with little or no decrease from the activity of recent weeks. Estimates of business closed last week place the total at somewhat more than 25,000 tons, while pending inquiry is close to 15,000 tons in this district. Among the larger inquiries are 5000 tons for the American Tube & Stamping Co., Bridgeport, Conn., 1500 tons of malleable and 1500 tons of foundry for the New York Air Brake Co., Watertown, N. Y., and about 1000 tons of high silicon iron for the Phillipsburg, N. J., plant of the Ingersoll-Rand Co. As additional evidence that some buyers are finding the present level of prices attractive for fourth quarter, the Richmond Radiator Co., 1480 Broadway, New York, originally in the market for 1200 to 1500 tons for Norwich, Conn., and 5000 to 6000 tons for Uniontown, Pa., closed with a northern New York furnace for close to 2000 tons and with a Valley producer for about 12,000 tons. Prices show no substantial change, with Buffalo furnaces quoting on a base of $18.50 to $19 and occasionally equalizing freight rates to meet competition, eastern Pennsylvania producers on a $21 base and northern New York and New England furnaces keen competitors for tonnage in this district. Although, except for the Massachusetts furnace, quotations have been commonly on a Buffalo base, there is more of a tendency to quote f.o.b. furnace. Foreign iron has had a minor place in the market of the past few weeks.

We quote per gross ton delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.54 from Virginia:

East Pa. No. 2 fdy., sil. 1.75 to 2.25	$23.52 to $24.02
East Pa. No. 2X fdy., sil. 2.25 to 2.75	24.02 to 24.52
East Pa. No. 1X fdy., sil. 2.75 to 3.25	24.52 to 25.02
Buffalo fdy., sil. 1.75 to 2.25 (all-rail)	23.41 to 23.91
Buffalo fdy., sil. 1.75 to 2.25 (by barge canal, del'd alongside in lighterage limits, N. Y. and Brooklyn)	22.75
No. 2 Virginia fdy., sil. 1.75 to 2.25	27.54 to 28.04

Ferroalloys.—Sellers report almost an entire dearth of inquiry of even small orders for ferromanganese, consumers being evidently well covered. One British agent sold recently a carload at $110, seaboard. Prices remain nominally unchanged. In spiegeleisen an occasional carload order is noted, but new business is extremely light, with prices unchanged. Specifications on contract for both alloys continue heavy. New business in 50 per cent ferrosilicon and standard ferrochromium is confined to small lots, but demand from consumers on contract is very satisfactory.

Warehouse Business.—Although the final week of June marked a slight decline in the volume of purchases from stock, the month as a whole was but little below May, the largest previous month of the year. With the exception of sheets, prices are holding firmly to the established schedule. Both black and galvanized have been reduced 20c. per 100 lb. and while the concession of 15c. per 100 lb. for 50 bundles or more continues on galvanized, the 15c. per 100 lb. concession on black is given for lots of 25 bundles or more. The range of price is now 5.15c. to 5.30c. per lb. base on galvanized and 4.15c. to 4.30c. per lb. base on black. The normal shrinkage in demand for structural steel at this season has finally appeared but there is no evidence of lower quotations.

Cast Iron Pipe.—Current buying of bell and spigot pipe is principally of small tonnages with private users showing the greater activity. The Department of Water Supply, Gas and Electricity, New York, will open bids July 13 and 16 on several small contracts for furnishing and laying water pipe, representing

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished steel shafting and screw stock—	
Rounds and hexagons	4.00c.
Flats and squares	4.50c.
Cold-rolled strip, soft and quarter hard	6.25c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage)	3.89c.
Long terne sheets (No. 28 gage)	6.35c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread	40 and 10
Carriage bolts, cut thread	30 and 10
Coach screws	40 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1¼-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	4	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 *x* 20 *in.*)

	Prime	Seconds
Coke, 100-lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 *x* 20 *in.*)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass†

	Per Lb.
Nos. 18 to 20	3.95c. to 4.10c.
Nos. 22 and 24	4.00c. to 4.15c.
No. 26	4.05c. to 4.20c.
No. 28*	4.15c. to 4.30c.
No. 30	4.35c. to 4.50c.

Sheets, Galvanized†

	Per Lb.
No. 14	4.25c. to 4.40c.
No. 16	4.40c. to 4.55c.
Nos. 18 and 20	4.55c. to 4.70c.
Nos. 22 and 24	4.70c. to 4.85c.
No. 26	4.85c. to 5.00c.
No. 28*	5.15c. to 5.30c.
No. 30	5.65c. to 5.80c.

* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

†Lower price is for lots of 50 bundles or more.

total requirements of about 300 tons. Most makers are well booked with tonnage, particularly in the smaller sizes, to carry them through the summer and with foreign competition temporarily at a minimum, prices are showing considerable firmness.

We quote pressure pipe per net ton, f.o.b. New York in carload lots, as follows: 6-in. and larger, $50.60 to $52.60; 4-in. and 5-in., $55.60 to $57.60; 3-in., $65.60 to $67.60; with $5 additional for Class A and gas pipe.

Finished Steel.—How much buying there has been since July 1 is not readily determinable, but orders entered on mill books for definite mill scheduling in five days of July have probably exceeded by a large margin the volume similarly entered on mill books, notwithstanding the holiday period this month. Much of this represents heavy orders entered at the close of June. It is becoming increasingly clear that most large regular consumers of steel have protection through the third quarter. There are signs that no small part of this has been entered at the second quarter prices, or the levels obtaining prior to the latest advance. The result is that fresh buying through July is not expected to be large. However, mills appear to have plenty to maintain a high rate of operations throughout July. Sellers are generally emphatic that new business can be entered only on the basis of 2c., Pittsburgh, for bars and shapes, and 1.90c. for plates. Price irregularity has not yet disappeared in the sheet market, and while 3.10c. is commonly named as the minimum for black sheets and 4.30c. for galvanized sheets, the view is held that an attractive order could be placed $1 or $2 a ton below these prices.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.34c. per lb.; plates, 2.24c.; structural shapes, 2.24c. to 2.34c.; bar iron, 2.24c.

Coke.—The market is only moderately active, except for an occasional fair-sized purchase of the foundry grade. Two inquiries for standard foundry, about 1000 tons in each, are before the market. A fair tonnage of furnace coke was closed last week. Distress tonnages of foundry continue to appear at $4 per ton, Connellsville, and of furnace at $2.75 to $3 per ton, Connellsville. Standard brands of foundry bring $7.91 to $9.16 per net ton, delivered Newark and Jersey City, N. J., $8.03 to $9.28, northern New Jersey, and $8.79 to $10.04, New York or Brooklyn, N. Y. By-product is quoted at $9.75 to $10.77, delivered Newark or Jersey City, N. J.

Old Material.—Buying by eastern Pennsylvania consumers continues at a minimum, but the tendency of most grades of scrap is apparently toward greater strength. Heavy melting steel is being purchased by brokers at $14.50 to as high as $15.50 and more, delivered eastern Pennsylvania, but this situation has apparently been caused by the insistence of consumers for better deliveries. Machine shop turnings have been purchased at $13.50 per ton, delivered to an eastern Pennsylvania consumer to fulfill $13.50 contracts. Other grades are firm but unchanged in price.

Buying prices per gross ton, New York, follow:

Heavy melting steel (yard)	$9.75 to $10.25
Heavy melting steel (railroad or equivalent)	11.25 to 12.25
Rails for rolling	12.00 to 12.50
Relaying rails, nominal	23.00 to 24.00
Steel car axles	18.50 to 19.00
Iron car axles	22.00 to 22.50
No. 1 railroad wrought	13.50 to 14.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long	12.00 to 12.50
Cast borings (steel mill)	9.25 to 9.75
Cast borings (chemical)	12.00 to 13.00
Machine shop turnings	9.50 to 10.00
Mixed borings and turnings	9.25 to 9.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.25 to 10.75
Stove plate (steel mill)	9.50 to 10.00
Stove plate (foundry)	10.25 to 10.50
Locomotive grate bars	10.50 to 11.50
Malleable cast (railroad)	16.00 to 16.50
Cast iron car wheels	12.25 to 12.75
No. 1 heavy breakable cast	12.00 to 13.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$16.50 to $17.00
No. 1 heavy cast (columns, building material, etc.), cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	14.00 to 14.50

Philadelphia

Steel Mills Enter Second Half with Good Order Books—15,000-Ton Basic Sale

PHILADELPHIA, July 6.—Eastern steel mills enter upon the second half of the year with better filled order books than they have had since the first quarter. In some lines, particularly bars and structural shapes, there has been fairly heavy buying, with the result that "closed rollings" will be the rule at some mills for the next few weeks. The leading Eastern maker of structural shapes announces that its June bookings were 40 per cent in excess of any previous month this year, the total being considerably in excess of monthly mill capacity. A large part of the business in shapes and bars can be attributed to the desire of buyers to specify fully on second quarter contracts and "protections" before third quarter prices, which are $2 a ton higher, went into effect. An interesting feature of the structural steel bookings was the large number of small building jobs, ranging from 50 to 150 tons, for which steel was bought. In plate business there was an improvement, but it was not so marked as in shapes and bars, because no price change was imminent, but a good-sized plate tonnage was placed in connection with structural work.

Sales of pig iron in the week have totaled 35,000 or 40,000 tons, including 15,000 tons of basic and about 10,000 tons of pipe iron. Basic has reached a new low level of $21, delivered.

Pig Iron.—In determining to restrict sales largely to the territory in which they have an advantage, eastern Pennsylvania furnaces have to that extent strengthened their position in the last week. After a few attempts to meet competition of New York State and New England furnaces, some of the eastern Pennsylvania operators have decided to confine their sales activities to this immediate district, where prices are more stable. In the past week sales of foundry iron have totaled 20,000 tons or more, prices ranging from $21 to $21.50, furnace, for the base grade. In addition there was a 15,000-ton sale of basic iron by two furnaces to a steel company, but on this grade a new low level was reached on a part of the iron, namely $21, delivered. Two other steel companies, which have been considering the purchase of about 10,000 tons each, have not bought. One of them, a Steel Corporation subsidiary, probably will not buy in this market, but will continue to draw on Pittsburgh furnaces as usual. Of the foundry iron sales, about 10,000 tons was to a cast iron pipe company at $21.50, delivered, but the grade was equivalent to No. 3 foundry. The J. L. Mott Iron Works, Trenton, N. J., divided an order for 1000 tons between two furnaces. The New York Air Brake Co. is in the market for 1500 tons of foundry and 1500 tons of malleable iron for last half requirements. Foreign iron is less conspicuous in sales because of the closely competitive prices on domestic iron, but a fair amount is being sold each week. German iron is offered at $20 to $20.50, Philadelphia, and other foreign irons bring slightly higher prices, sometimes as much as the best grades of domestic iron.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76c. to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$21.76 to $22.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.26 to 22.76
East. Pa. No. 1X	22.76 to 23.26
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.67 to 28.67
Virginia No. 2X, 2.25 to 2.75 sil.	28.17 to 29.17
Basic delivered eastern Pa.	21.00 to 21.25
Gray forge	21.50 to 22.00
Malleable	22.00 to 22.50
Standard low phos. (f.o.b. furnace)	22.00 to 23.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00

Ferromanganese.—The market remains quiet, with prices unchanged at $88 to $90, furnace.

Billets.—Buying of billets is in light volume, but prices are unchanged at $35, Pittsburgh, for rerolling quality and $40 for ordinary forging quality.

Plates.—Eastern plate mills have booked a fairly good tonnage in the past two weeks, sufficient at least to insure a continuance of operations through July at about the June rate, which was close to 75 per cent at some mills. Talk among the mills of an advance on plates to 2c., Pittsburgh, has been abandoned, but there is a general adherence to 1.90c., Pittsburgh, and no concessions are reported even on the more attractive tonnages.

Structural Shapes.—In the last week of June and to some extent in the first few days of July fabricators and other users of structural shapes have sent in to the mills heavy specifications against second quarter contracts or against "protections" on specific jobs. Such business was booked at 1.90c., Pittsburgh, but 2c. now applies on all new business. As most of the larger users are well protected on the 1.90c. basis for a month or more, actual sales at 2c. have so far applied only to small lots from the occasional buyer. The tonnage of shapes booked was so heavy, however, that the mills are in an excellent position to stand firmly for the new price.

Old Material.—Although quotations on heavy melting steel remain nominally at a range of $14.50 to $15.50, brokers are firm in the belief that the next sales of importance will be at higher prices. There has not been enough activity in any grades to give the market any real signs of strength, but the fact that steel-making grades are coming out less freely makes brokers hesitant to accept new orders at present prices. In several cases it is costing brokers, to cover on old orders, prices equal to those at which they sold.

We quote for delivery, consuming points in this district, as follows:

No. 1 heavy melting steel	$14.50 to $15.50
Scrap rails	15.00 to 15.50
Steel rails for rolling	15.50 to 16.00
No. 1 low phos., heavy, 0.04 per cent and under	19.00 to 20.00
Couplers and knuckles	17.00 to 17.50
Rolled steel wheels	17.00 to 17.50
Cast iron car wheels	17.00 to 17.50
No. 1 railroad wrought	16.50 to 17.00
No. 1 yard wrought	16.00 to 16.50
No. 1 forge fire	13.00 to 13.50
Bundled sheets (for steel works)	13.50
Mixed borings and turnings (for blast furnace)	12.50 to 13.00
Machine shop turnings (for steel works)	13.50
Machine shop turnings (for rolling mills)	13.50 to 14.00
Heavy axle turnings (or equivalent)	14.00 to 14.50
Cast borings (for steel works and rolling mill)	13.50 to 14.00
Cast borings (for chemical plant)	15.00 to 15.50
No. 1 cast	17.00 to 18.00
Heavy breakable cast (for steel works)	16.50
Railroad grate bars	14.00
Stove plate (for steel works)	14.00
Wrought iron and soft steel pipes and tubes (new specifications)	14.50 to 15.00
Shafting	20.00 to 21.00
Steel axles	21.50 to 22.00

Bars.—Specifications for steel bars were heavy in the last several days of June and the mills have better backlogs than in some time. The new price, 2c., Pittsburgh, now seems to be well established, although of course much of the tonnage which the mills are to ship this month will be billed at the second quarter price. Bar iron is quoted at 2.22c., Philadelphia.

Sheets.—There is less scrambling for sheet orders at the low levels which have recently prevailed. On black sheets 3.10c., Pittsburgh, is the common quotation, and quotations below that figure apparently are less frequent. On galvanized sheets the range is 4.30c. to 4.40c. and on blue annealed 2.30c. to 2.40c.

Imports.—Last week's pig iron imports totaled 2788 tons, of which 1488 tons came from India and 1300 tons from the Netherlands. Other imports in the week were as follows: Manganese ore from Chile, 1000 tons; manganese ore from Java, 285 tons; iron ore from Spain, 495 tons; structural steel from Belgium, 117 tons; structural steel from Germany, 40 tons; steel bars from Germany, 65 tons.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Tank steel plates, ¾-in. and heavier	2.80c. to 3.00c.
Tank steel plates, ¼-in.	3.00c.
Structural shapes	2.75c. to 2.90c.
Soft steel bars, small shapes and iron bars (except bands)	3.00c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	3.00c.
Cold-finished steel, rounds and hexagons	4.00c.
Cold-finished steel, squares and flats	4.50c.
Steel hoops	4.00c. to 4.25c.
Steel bands, No. 12 gage to ¼-in., inclusive	3.75c. to 3.90c.
Spring steel	5.00c.
No. 28 black sheets	4.35c.
No. 10 blue annealed sheets	3.40c.
No. 28 galvanized sheets	5.55c.
Diamond pattern floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Tool steel	8.50c.
Swedish iron bars	6.00c. to 6.50c.

REINFORCING STEEL

Awards of 6600 Tons Include 1200 Tons for a Chicago Apartment Hotel

Concrete reinforcing bar awards in the week totaled more than 6600 tons, as reported to THE IRON AGE, the largest being 1200 tons for the Touraine Hotel, Chicago. A viaduct in Los Angeles calls for 814 tons. Jobs pending total nearly 2000 tons, including 1000 tons for a power plant for the New York Steam Corporation. Awards follow:

BOSTON, 300 tons, garage, Huntington Avenue, to Truscon Steel Co.

BROOKLINE, MASS., 175 tons, apartment building, to unnamed company by Coleman Brothers.

STATE OF NEW JERSEY, 300 tons, road work, to Truscon Steel Co.

BROOKLYN, 100 tons, store, bank and office building, Court and Montague Streets, to McClintic-Marshall Co.

NEW YORK, 520 tons, Wolf Building, to McClintic-Marshall Co.

CLEVELAND, 400 tons, Halle store addition, to Bourne-Fuller Co.

CHICAGO, 1200 tons of rail steel, Touraine Hotel, Lake Shore Drive and Schiller Street, to Inland Steel Co.

CHICAGO, 600 tons of rail steel, apartment building, Seventieth Street and South Shore Drive, to Inland Steel Co.

CHICAGO, 400 tons of rail steel, apartment building, 399 Fullerton Parkway, to Inland Steel Co.

CHICAGO, 350 tons of rail steel, apartment building, 70 East Cedar Street, to Inland Steel Co.

CHICAGO, 300 tons of rail steel, Student Y. M. C. A., to Olney J. Dean & Co.

CHICAGO, 150 tons of rail steel, building for Prairie Farmer Publishing Co., to Olney J. Dean & Co.

CHICAGO, 350 tons, Northwestern Terminal Garage, to Joseph T. Ryerson & Son.

CHICAGO, 100 tons, warehouse, Jackson Express & Storage Co., 4046 West Madison Street, to Barton Spider-Web System, Inc.

ELGIN, ILL., 500 tons, factory addition, Elgin National Watch Co., to Kalman Steel Co.

PEORIA, ILL., 100 tons, Blaine Summer School, to Olney J. Dean & Co., instead of to another fabricator as previously reported.

WAUKEGAN, ILL., 330 tons, Public Service Co. of Northern Illinois, 200 tons for a power station, to Jones & Laughlin Steel Corporation, and 133 tons, intake and discharge tunnels and crib house, to Barton Spider-Web System, Inc.

LOS ANGELES, 814 tons, Seventh Street viaduct, to unnamed firm.

HOLLYWOOD, CAL., 135 tons, Music Box Theater, to unnamed jobber.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 1000 tons, New York Steam Corporation building; general contract to Dwight P. Robinson & Co.

DAYTON, OHIO, tonnage unknown, buildings for Delco Light Co.; Schenk & Williams, Dayton, architects.

COVINGTON, KY., 160 tons, junior high school.

CHICAGO, 170 tons, Garfield Park Hospital; general contract awarded to Guy McClintock & Co., Oak Park, Ill.

CHICAGO, 200 tons, building at 1400 Lake Shore Drive; general contract awarded to Avery Brundage, Chicago.

CHICAGO, 400 tons, Midwest Athletic Club; general contract awarded to Ebenholtz & Jorgenson Co.

San Francisco

Current Buying Light—First Half Fabricated Awards Total 119,969 Tons

SAN FRANCISCO, July 3 (*By Air Mail*).—Individually, and in the aggregate, both lettings and inquiries have been comparatively light during the past week. The pre-holiday tone of the market, the continuation of the local carpenter's strike, now in its fourth month, and the apparent disinclination of buyers to anticipate their forward requirements, or to test the strength of prices now being quoted by most of the Eastern mills on the heavier forms of steel, are the three chief contributory factors which account for the present quietness in nearly all departments of the market.

On the Pacific Coast, the first half of the year failed to fulfill the promise of its first quarter, except in fabricated lettings. Awards in fabricated steel for the first half, as tabulated by the San Francisco office of THE IRON AGE, total 119,969 tons, against 114,048 tons for the first half of 1925, a gain of 5921 tons. This includes both plates and shapes. Reinforcing bar contracts known to have been placed during the first half of this year total about 20,000 tons, against 36,734 tons for the similar period of last year. In cast iron pipe, public contracts awarded in the past six months total about 35,300 tons, which is approximately 10,000 tons less than the aggregate for the first half of 1925.

Pig Iron.—A shipment of about 200 tons of Indian foundry iron has been received by a local importer. While no reliable figures are available at present, it is understood that there was a slightly larger tonnage of imported iron consumed on the Pacific Coast this year than during the first half of 1925. The total aggregate tonnage of domestic and imported irons purchased by Pacific Coast melters during the past six months, is understood to be less than the amount used in the first half of last year. Foundry production has fallen off in the San Francisco Bay district, and foundrymen say that the labor situation is far from satisfactory.

*Utah basic	$26.00 to $27.00
*Utah foundry, sil. 2.75 to 3.25	26.00 to 27.00
**English foundry, sil. 2.75 to 3.25	25.00
**Indian foundry, sil. 2.75 to 3.25	25.00
**German foundry, sil. 2.75 to 3.25	23.00 to 23.50
**Dutch foundry, sil. 2.75 to 3.25	22.50
**Belgium foundry, sil. 2.75 to 3.25	22.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—Lettings for the week total 1340 tons. No fresh inquiries of importance have come into the market. Eastern mills continue to quote plain material at 2.30c. to 2.35c. c.i.f. Coast ports.

Plates.—Only one letting of over 100 tons is known to have been placed during the week—130 tons for a steel tank in Los Angeles, taken by the Western Pipe & Steel Co. of California. No inquiries of moment have developed, and very few large tonnages are pending. While most of the Eastern mills are now quoting 2.30c., c.i.f. Coast ports, 2.25c. is still obtainable on round tonnages.

Bars.—Two unnamed reinforcing bar jobbers in Los Angeles have taken 814 tons and 135 tons, respectively, for a viaduct in Los Angeles and a theater in Hollywood. Concrete work in the San Francisco Bay district is hampered by the carpenters' strike. Local reinforcing bar jobbers quote as follows: 2.80c., base, per lb. on lots of 250 tons; 2.95c., base, on carload lots, and 3.20c., base, on less than carload lots. There is very little activity in soft steel bars.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.30c.
Mild steel bars and small angles	3.30c.
Small channels and tees, ¾-in. to 2¾-in.	3.90c.
Spring steel, ¼-in. and thicker	6.30c.
No. 28 black sheets	4.75c.
No. 10 blue annealed sheets	3.75c.
No. 28 galvanized sheets	6.00c.
Common wire nails, base per keg	$3.50
Cement coated nails, base per keg	3.00

Cast Iron Pipe.—Grinnell Co. of the Pacific has taken 293 tons of 12 in., Classes B and C pipe, required by Los Angeles. It is understood that Belgian pipe will be furnished. No fresh inquiries of importance have come out. Quotations are unchanged at $50 to $52, base, water shipment, San Francisco.

Warehouse Business.—While complete figures are unavailable, it is understood that June sales, generally, were approximately the same as they were during the corresponding month of last year. Sales during the first quarter of this year showed a gain over the like period of 1925, but during the past three months there was a gradual falling off in volume. Buyers have shown little disposition to increase their specifications for the third quarter. Quotations are unchanged, although in some items slightly weaker tendencies are apparent.

Coke.—San Francisco importers have placed large contracts for coke in Germany since the British coal strike started. Fresh shipments from the Continent are due here in late July or early August. German by-product coke is quoted at $12 to $12.50 per net ton, incoming dock.

Firebrick.—Local importers have been notified by the custom house that hereafter all firebrick imported into the United States must be plainly marked in English, so that the name of the country of its origin may be quickly and easily seen. No shipments of firebrick have been received recently, and none is known to be en route at present.

Old Material.—Buying is sluggish, and few transactions or inquiries of interest have come up lately. Heavy melting steel is quoted at $10 to $10.50 per gross ton, delivered to consumers' yards.

St. Louis

Smaller Pig Iron Users Coming into Market—Scrap Prices Again Higher

ST. LOUIS, July 6.—Pig iron continues active. While most of the principal melters covered their requirements earlier in the movement, smaller users are coming in and either buying or putting out definite inquiries. Latest sales reported total close to 5000 tons, which brings the aggregate since the first week in June to above 125,000 tons, including all grades and kinds. Prices are steady, but despite the large tonnage which has changed hands, there has been no upward trend in quotations. Inquiries pending amount to 5000 to 6000 tons, and include 500 to 1000 tons for a Belleville melter, 500 tons for a Quincy, Ill., specialty manufacturer and 200 tons for an East Side job foundry.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices, $2.16 freight from Chicago, $4.42 from Birmingham, all rail, and 81c. average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$22.66 to $23.16
Northern malleable, sil. 1.75 to 2.25	22.66 to 23.16
Basic	23.16 to 24.16
Southern fdy., sil. 1.75 to 2.25	24.42 to 25.42
Granite City iron, sil. 1.75 to 2.25	22.81 to 23.31

Finished Iron and Steel.—The recent spell of high temperatures has resulted in a slight recession in the demand from the general manufacturing trade. Specifications are coming in more slowly, and new business lags. Public utility companies are conducting extensive improvements, and the outlet through that channel is satisfactory. The demand for standard structural shapes and reinforcing concrete bars is brisk, but fabricators report the usual seasonal slowing. Plates are in fair demand, and the leading local producer continues to operate at from 70 to 75 per cent of capacity. No change in prices was reported.

Coke.—Contracting for metallurgical coke for the next twelve months is in good volume. The leading East Side by-product producer reports the sale of 15,000 tons to a manufacturer of heating apparatus, and an aggregate of 5000 tons to smaller consumers. Western melters are dealing more extensively in this market than in former years. Domestic coke is showing

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, mild steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
No. 28 black sheets	4.60c.
No. 10 blue annealed sheets	3.60c.
No. 28 galvanized sheets	5.70c.
Black corrugated sheets	4.65c.
Galvanized corrugated sheets	5.75c.
Structural rivets	3.65c.
Boiler rivets	3.85c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller	70
Machine bolts	50 and 5
Carriage bolts	47½
Lag screws	55 and 5
Hot-pressed nuts, square, blank or tapped	3.25c. off per lb.
Hot-pressed nuts, hexagons, blank or tapped	3.75c. off per lb.

more life, with a slight upward trend in prices. Stocks in by-product yards are the smallest for this particular season in more than five years.

Old Material.—Dealers in scrap iron and steel continue to display great faith in the future and are bidding up prices in lively fashion. Quotations were advanced generally through the entire list. Heavy melting and shoveling were boosted to $13, the highest point in many weeks. The industries, however, are playing a waiting game and taking only small quantities to fill in with. Several mills are contemplating curtailing operations, and most of the foundries are on part time. Railroads are realizing top figures, taking advantage of dealers' buying enthusiasm to unload. Lists before the trade included the following: Missouri-Pacific, 4300 tons; Mobile & Ohio, 1000 tons; Big Four, 2200 tons; Pennsylvania, 40,200 tons and 20 locomotives; Burlington, 5500 tons, and Missouri-Kansas-Texas, 400 tons of relaying rails.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Iron rails	$11.50 to	$12.00
Rails for rolling	15.00 to	15.50
Steel rails less than 3 ft	15.50 to	16.00
Relaying rails, 60 lb. and under	20.50 to	23.50
Relaying rails, 70 lb. and over	26.50 to	29.00
Cast iron car wheels	15.50 to	16.00
Heavy melting steel	13.00 to	13.50
Heavy shoveling steel	13.00 to	13.50
Frogs, switches and guards cut apart	14.50 to	15.00
Railroad springs	16.50 to	17.00
Heavy axle and tire turnings	9.00 to	9.50
No. 1 locomotive tires	16.00 to	16.50
	Per Net Ton	
Steel angle bars	12.00 to	12.50
Steel car axles	17.25 to	17.75
Iron car axles	20.50 to	21.00
Wrought iron bars and transoms	18.25 to	18.75
No. 1 railroad wrought	11.00 to	11.50
No. 2 railroad wrought	11.50 to	12.00
Cast iron borings	8.75 to	9.25
No. 1 busheling	9.75 to	10.25
No. 1 railroad cast	14.50 to	15.00
No. 1 machinery cast	16.50 to	17.00
Railroad malleable	13.00 to	13.50
Machine shop turnings	6.25 to	7.75
Bundled sheets	6.75 to	7.25

Boston

All Buffalo Furnaces Reduce Pig Iron Prices—Buying Fairly Active

BOSTON, July 6.—Due to the keen competition from other New York State furnaces in New England, Buffalo furnaces heretofore maintaining $20 furnace base have cut prices $1 a ton. A Buffalo steel mill has taken considerable business in this territory the past week at $18 to $18.50 a ton base, reserving the right to ship from Buffalo or eastern Pennsylvania. A Massachusetts valve manufacturer increased its purchase of No. 2 plain, last half iron, from 750 tons to 1200 tons, and took an additional 1000 tons of No. 2X, splitting the business with two New York State furnaces at delivered prices equivalent to the Buffalo steel mill basis. Another New York State furnace, however, continues to book orders for last half shipment at prices equivalent to $17.50 a ton, Buffalo base. The Mystic Iron Works has booked further orders at $21 Everett for No. 2 plain, $21.50 for No. 2X and at $22.50 for No. 1X. It is now probable the Everett furnace will blow in the last of next month. Some India iron sold the past week at former prices, but foreign irons collectively, as well as eastern Pennsylvania, Virginia and Alabama have not cut much figure in recent business. Sales for the past week approximated 6000 tons.

We quote delivered prices on the basis of the latest sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 1.75 to 2.25	$24.15 to $25.15
East. Penn., sil. 2.25 to 2.75	24.65 to 25.65
Buffalo, sil. 1.75 to 2.25	22.91 to 23.91
Buffalo, sil. 2.25 to 2.75	23.41 to 24.91
Virginia, sil. 1.75 to 2.25	27.92 to 29.92
Virginia, sil. 2.25 to 2.75	28.42 to 30.42
Alabama, sil. 1.75 to 2.25	30.60 to 31.60
Alabama, sil. 2.25 to 2.75	31.10 to 32.10

Shapes and Plates.—Fabricators reported no important business closed the past week, and practically no new inquiries involving 100 tons or more. The market for shapes is firm at 2c. per lb., Pittsburgh base, while plates are holding well at 1.90c. Sheet prices remain as heretofore, blue annealed still being available at 2.25c. to 2.30c,, Pittsburgh base, galvanized at 4.25c. to 4.30c., and black at 3.10c. Buyers, who a week ago intimated they would shortly be in the market for sheets, have taken no action.

Warehouse Business.—Warehouses in general report a light demand for iron and steel, but add that a falling off in business is customary at this time of the year. Warehouse stocks are only comfortably large, but well assorted. It is still possible to secure small lot shipments from steel mills on short notice. Warehouses are encountering competition from material dealers on German structural steel, which has been sold recently, cut to length, at as little as 2½c. per pound. The market for wire nails is somewhat firmer inasmuch as special prices have practically disappeared.

Coke.—As intimated a week ago by the New England producers, they made no change in their price on by-product foundry coke as applied to last half contract specifications, the price remaining at $12 a ton delivered within a $3.10 freight rate zone. Both the New England Coal & Coke Co. and the Providence Gas Co. are stocking domestic fuel fairly freely, but comparatively little foundry coke. Shipments of foundry coke remain small.

Old Material.—Most of the heavy melting steel moved the past week fetched $10.50 to $11 on cars shipping point, an advance of 50c. a ton from the recent low point. A little pipe was taken the past few days at $10 a ton on cars, but the bulk of recent transactions have been at $9 to $9.50. The market for forged scrap, long bundled skeleton and forged flashings is about 50c. a ton higher. Prices otherwise show little if any variation from those prevailing three week or more ago. The movement of old material out of New England continues limited owing to the unwillingness of holders to sell at prevailing quotations.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Soft steel bars and small shapes	3.265c.
Flat, hot rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, square and flats	7.10c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Plates	3.365c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hexagons	3.95c.
Squares and flats	4.45c.
Toe calk steel	6.00c.

The general feeling in the buying trade, however, is more cheerful than it has been in some time.

The following prices are for gross-ton lots delivered consuming points:

Textile cast	$19.50 to $20.00
No. 1 machinery cast	19.00 to 19.50
No. 2 machinery cast	17.00 to 18.00
Stove plate	13.00 to 13.50
Railroad malleable	18.50 to 19.00

The following prices are offered per gross-ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.50 to $11.00
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought	12.00 to 12.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	9.00 to 9.50
Machine shop turnings	8.25 to 8.75
Cast iron borings, chemical	10.00 to 10.50
Cast iron borings, rolling mill	8.00 to 8.50
Blast furnace borings and turnings	8.00 to 8.50
Forged scrap	8.50 to 9.00
Bundled skeleton, long	8.50 to 9.00
Forged flashings	8.50 to 9.00
Bundled cotton ties, long	8.25 to 8.50
Bundled cotton ties, short	8.50 to 9.00
Shafting	15.00 to 15.50
Street car axles	16.50 to 17.50
Rails for rerolling	11.00 to 11.50
Scrap rails	10.00 to 10.50

Buffalo

Sustained Activity in Finished Steel—Advances in Scrap

BUFFALO, July 6.—The estimated inquiry for the week is about 20,000 to 25,000 tons, which includes some business in the East which is not likely to come to Buffalo, because of the competition furnished by some of the Eastern furnaces. The price in this territory is firm at $20 with practically all furnaces making concessions on Eastern business. Nineteen dollars is freely done and reports of $18 and $18.50 are thought to have basis of fact. Several inquiries are out for 1000 tons of foundry and some for 2000 tons. One interest reports considerable placing of lots of 500 to 600 tons. Two or three inquiries for 2000 to 2500 tons of foundry have since been pared down.

We quote prices per gross ton, f.o.b. Buffalo, as follows:

No. 2 plain fdy., sil. 1.75 to 2.25	$19.00 to $20.00
No. 2X foundry, sil. 2.25 to 2.75	19.50 to 20.50
No. 1X foundry, sil. 2.75 to 3.25	20.50 to 21.50
Malleable, sil. up to 2.25	20.00
Basic	19.00
Lake Superior charcoal	29.28

Finished Iron and Steel.—Improved specifications and higher rate of operation lends a better tone to this market this week. Bars are firm at 2.265c. to 2.365c.; shapes at 2.265c. and plates at 2.165c. One large mill reports heavy specifications in all three lines for the second quarter. Reinforcing bar business includes 200 tons placed by the Art Metal Co., Jamestown, N. Y., 100 tons for an almshouse at Ontario, N. Y., and an automobile display building requiring 125 tons. Sheets are firmer with 3.10c., Pittsburgh, being generally quoted on black. Mill operation shows about 75 to 80 per cent of mill capacity in operation.

Old Material.—The market is in a state of expectancy with the prospect very shortly of activity by the mills. Prices are stronger, though there has been no new buying. Heavy melting steel of strictly No. 1 grade has stiffened to $16 to $16.50, railroad lists of the Erie and Michigan Central, which closed last week, having brought equivalent of $16, Buffalo, though it is not certain the material came here. The Pennsylvania list closes this week. Stove plate is the most active commodity on the list, selling strong at $15, with some $15.25 business having been done. No. 1 cast scrap shows activity also at $16.25. One mill has been buying turnings around $10 and blast furnace material has been selling at $12. Dealers are very active covering orders.

We quote prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$14.50 to $14.75
Selected No. 1 heavy melting steel	16.00 to 16.50
Low phosphorus	17.50 to 18.00
No. 1 railroad wrought	14.00 to 14.50
Car wheels	17.00 to 17.50
Machine shop turnings	9.50 to 10.00
Mixed borings and turnings	11.50 to 12.00
Cast iron borings	11.50 to 12.00
No. 1 busheling	15.00 to 15.50
Stove plate	15.00
Grate bars	13.00 to 13.50
Hand-bundled sheets	10.00 to 10.50
Hydraulic compressed	15.00 to 15.50
No. 1 machinery cast	16.00 to 16.25
Railroad malleable	16.50 to 17.00
Iron axles	24.00 to 25.00
Steel axles	16.00 to 16.50
Drop forge flashings	12.75 to 13.25

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Mild steel bars	3.30c.
Cold-finished shapes	4.45c.
Rounds	3.95c.
No. 28 black sheets	4.45c.
No. 10 blue annealed sheets	3.80c.
No. 28 galvanized sheets	5.60c.
Common wire nails, base per keg	$3.90
Black wire, base per 100 lb	3.90

Birmingham

Pig Iron Selling Shows Good Consumption—Cast Pipe at Capacity

BIRMINGHAM, July 6.—Additional sales of pig iron by Alabama furnace interests are being made from day to day, in comparatively small lots, with now and then inquiries from large melters for a portion of their probable needs. Business booked and in sight with some of the larger consumers will warrant full operation. Several steel fabricating shops of the district are active and anticipate continued steadiness through the year. Pig iron quotations remain unchanged, around $21 per ton, No. 2 foundry. Inquiries are being received as to iron for last half, but no base price has been fixed for that period. Surplus stocks of foundry iron will be moved off during the last half, an immediate start being assured, as melters ask for delivery. Production of pig iron can be improved but little, one blast furnace being relined and repaired now, to resume production in the next few weeks. Two furnaces of the Tennessee Coal, Iron & Railroad Co. will soon be ready to resume operations.

We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 2 foundry, 1.75 to 2.25 sil.	$21.00 to $22.00
No. 1 foundry, 2.25 to 2.75 sil.	21.50 to 22.50
Basic	21.00 to 22.00
Charcoal, warm blast	30.00

Rolled Steel.—Mills and fabricating shops are active, the output of open-hearth furnaces finding ready markets and rolled steel in various shapes moving well. Structural steel fabricating plants are still busy, even the smaller plants, with local and other business in quantity. Nail and wire demand is showing improvement. Bands, hoops and cotton ties are in strong demand. The Connors Steel Co. is operating to capacity in all departments, including the new concrete reinforcing bar mill and angle bar plant. As no indications are to be seen that the cotton crop is going to be off this year, cotton ties are being produced and shipped in large quantity. The Tennessee company will shortly be in this line also, for the cotton tie mill at the Bessemer plant is nearing completion. Soft steel bars, Birmingham base, are at 2.10c. to 2.20c.; plates, 2.05c. to 2.15c., and structural beams, 2.05c. to 2.15c.

Coke.—Production at by-product ovens is held firm, while beehive oven output is being reduced, less than 100 ovens now making coke, including 26 on pitch coke. Local and foreign demand is steady, with prospects of Northern needs increasing. Prices are holding at $5.50 to $6 per ton, foundry coke. Building of 74 ovens at the Fairfield by-product plant of the Tennessee company will be followed next year by 50 ovens at the North Birmingham plant of the Sloss-Sheffield Steel & Iron Co.

Cast Iron Pipe.—Production is practically to capacity and will be kept that way indefinitely, demand being strong. New pipe shops here are being readjusted right along and will, in the course of a short while, be

operating steadily. No change in quotations has taken place. Estimates now are that production during last half-year will be as active as through the first six months.

Scrap.—Improvement is noted in the scrap iron and steel market, with prospects of an advance all down the line of 50c. to $1 per ton. Heavy melting steel is being held for $13 and $14 per ton, against $12 and $13 for the past several weeks. No. 1 cast is the most active of the old material list.

We quote per gross ton, f.o.b. Birmingham district yards, as follows:

Cast iron borings, chemical	$15.00 to $16.00
Heavy melting steel	12.00 to 13.00
Railroad wrought	12.00 to 13.00
Steel axles	17.00 to 18.00
Iron axles	17.00 to 18.00
Steel rails	13.00 to 14.00
No. 1 cast	16.50 to 17.00
Tramcar wheels	16.00 to 17.00
Car wheels	16.00 to 16.50
Stove plate	14.00 to 14.50
Machine shop turnings	7.50 to 8.00
Cast iron borings	7.50 to 8.00
Rails for rolling	15.00 to 16.00

Cincinnati

Pig Iron Consumers Covered for Third Quarter—Sheets Irregular

CINCINNATI, July 6.—With most consumers already having covered their third-quarter requirements and with furnaces well booked with orders for future delivery, the pig iron market has been quiet. Sales in the past week totaled less than 6000 tons. Producers in the southern Ohio district have advanced their price on foundry iron to $19.50, base furnace, and are refusing to take business under that figure. In fact, one Ironton furnace temporarily has withdrawn from the market. Several Alabama sellers are adhering strictly to $21, base Birmingham, but other producers are willing to accept limited tonnages at $20.50. Tennessee iron has been sluggish because the only active furnace in that state has a full order book for this quarter. Sales of Jackson county silvery iron have been the largest in many weeks. A Michigan melter has contracted for 1000 tons for last half delivery, while other consumers have bought lots ranging from 100 to 200 tons. A southern Ohio melter has purchased 500 tons of Northern foundry and a consumer in this territory has taken 650 tons of Southern iron. The Globe Stove Co., Kokomo, Ind., is inquiring for 1000 tons of Northern foundry. The American Stove Co., St. Louis, is expected to buy 300 tons each of Northern and Southern foundry and 150 tons of silvery for its Indianapolis plant. A local melter is in the market for 500 tons of Southern iron.

Based on freight rates of $3.69 from Birmingham and $1.89 from Ironton, we quote f.o.b. Cincinnati:

Alabama fdy., sil. 1.75 to 2.25 (base)	$24.19 to $24.69
Alabama fdy., sil. 2.25 to 2.75	24.69 to 25.19
Tennessee fdy, sil. 1.75 to 2.25	24.69
Southern Ohio silvery, 8 per cent	30.39
So. Ohio fdy., sil. 1.75 to 2.25	21.39
So. Ohio malleable	20.39 to 21.89

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, mild steel or iron	3.30c.
Reinforcing bars	3.30c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel	4.75c. to 5.00c.
No. 28 black sheets	4.10c. to 4.30c.
No. 10 blue annealed sheets	3.60c.
No. 28 galvanized sheets	5.25c. to 5.40c.
Structural rivets	3.75c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base per 100-lb. keg	3.15
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Finished Material.—Bookings in the last few days of the second quarter were exceptionally heavy. Many consumers took advantage of their final opportunity to cover below the advanced prices on bars and structural shapes. For the first time in many months there were important orders placed for future delivery and buyers apparently were contracting for substantial tonnages for stock purposes. The liberal specifications and orders, which already have given producers a better backlog, have had a strengthening effect upon the market. Whereas ten days ago doubt was expressed concerning the ability of mills to raise their schedule on bars and structural shapes $2 a ton, today it is expected that the new quotations will hold. In several cases consumers have tried unsuccessfully to secure concessions. Sheet prices show signs of having touched bottom. Black sheets continue to sell at 3.05c. to 3.10c., base Pittsburgh, and galvanized at 4.20c. to 4.25c., base Pittsburgh. The movement of automobile body sheets has been moderately good, and the market is steady at 4.20c., base Pittsburgh. Blue annealed sheets remain at 2.30c., base Pittsburgh. Bars are quoted at 2c., base Pittsburgh, for lots of 100 tons or more, but 2.10c. is asked for smaller tonnages. The demand for tank plates has been active at 1.90c., base Pittsburgh. Structural shapes are being sold for 2c., base Pittsburgh. Sale of wire goods have been confined to small quantities for immediate delivery. Common wire nails are firm at $2.65 per keg, Ironton or Pittsburgh, and plain wire at $2.50 per 100 lb., Ironton or Pittsburgh. Gas holder fabricators report sufficient work on hand to operate at capacity during the next two months. The Delco Light Co., Dayton, Ohio, which has started construction of additional buildings at its Moraine City, Ohio, plant, is expected to award 4000 tons of structural steel on which bids are being taken.

Reinforcing Bars.—The Delco Light Co., Dayton, Ohio, is expected to buy a considerable tonnage of bars for its new plant additions at Moraine City, Ohio. It is expected that 160 tons for the Junior High School, Covington, Ky., will be awarded in the near future. New billet bars are bringing 2c., Cleveland, and rail steel bars 1.90c., mill.

Warehouse Business.—Sales have been well sustained in the past week. Structural steel, bars and pipe continue to be the leading products in volume of business. Prices are firm and unchanged.

Coke.—The price of domestic by-product coke in Michigan has increased 25c. a ton, to $7.50, Detroit ovens, for outside delivery, on egg and nut grades. By-product foundry coke in Michigan will remain unchanged this month at $9.50, Detroit ovens, for outside shipment. Sales of both by-product and beehive coke in the past week have totaled a fairly good tonnage in the aggregate, although there were no orders of outstanding size.

Old Material.—The market again is showing signs of weakness. Mills are taking only small quantities of material on contract, and in one instance shipments have been suspended for several weeks. The recent strike of union molders in this city caused local foundries to hold up deliveries temporarily with a resultant depressing effect upon foundry grades.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton	
Heavy melting steel	$12.50 to $13.00
Scrap rails for melting	12.50 to 13.00
Short rails	17.50 to 18.00
Relaying rails	27.00 to 27.50
Rails for rolling	14.00 to 14.50
Old car wheels	13.00 to 13.50
No. 1 locomotive tires	17.00 to 17.50
Railroad malleable	15.50 to 16.00
Agricultural malleable	14.50 to 15.00
Loose sheet clippings	7.00 to 7.50
Champion bundled sheets	9.00 to 9.50
Per Net Ton	
Cast iron borings	7.00 to 7.50
Machine shop turnings	6.50 to 7.00
No. 1 machinery cast	17.00 to 18.00
No. 1 railroad cast	14.50 to 15.00
Iron axles	20.00 to 20.50
No. 1 railroad wrought	9.00 to 9.50
Pipes and flues	8.00 to 8.50
No. 1 busheling	9.50 to 10.00
Mixed busheling	7.00 to 7.50
Burnt cast	7.50 to 8.00
Stove plate	9.00 to 9.50
Brake shoes	9.50 to 10.00

Canadian Old Material Market Featureless

TORONTO, July 5.—The Canadian iron and steel scrap market has passed an uneventful week. The demand for old material shows little change. Melters are confining their interest almost entirely to small lots for immediate needs. Hamilton, Ont., consumers are placing orders and taking delivery on heavy melting steel and turnings, and it now appears that there is less tendency on the part of these large buyers to hammer down prices. With foundries operating generally at 35 to 50 per cent of capacity, consumption of old material on this account is at a minimum. Trading between dealers is affected by the comparatively quiet resale demand, although some buying is reported, especially in scrap that can be shipped direct to a consumer without having to be taken into the yards for sorting.

Dealers' buying prices are firm as follows:

	Toronto	Montreal
Per Gross Ton		
Steel turnings	$9.50	$6.50
Machine shop turnings	9.50	6.50
Wrought pipe	6.50	6.00
Rails	11.00	8.50
No. 1 wrought scrap	11.00	13.00
Heavy melting steel	10.50	8.50
Steel axles	16.00	17.00
Axles, wrought iron	17.00	19.00
Per Net Ton		
Standard car wheels	16.00	16.00
Malleable scrap	13.00	12.00
Stove plate	11.00	12.00
No. 1 machinery cast	16.00	18.00

Quiet Market Expected at Seattle

SEATTLE, July 2.—Local sales managers of Eastern steel mills and jobbers report that June was better than the same month last year, but a little below May of this year. The immediate outlook is that the next several months will be quiet. Building permits issued in Seattle in June amounted to $2,670,380, a record month.

Pig Iron.—A local interest has some foreign foundry iron on the water destined for Seattle, and is seeking orders for it at prices about $2 per ton lower than are asked for domestic iron. The Utah iron is being offered at $25 to $26, delivered, Seattle.

Plates.—The Bethlehem Steel Corporation, through its local offices, took the 1400 tons of plates for the new water lines at Tacoma, Wash., the Steel Pipe & Tank Co., Portland, having secured the contract for the work. Jobbers report sales of carload lots of plates at 2.30c., delivered Seattle.

Wire Products.—Demand for wire is quiet, but for wire nails is fairly active. Competition is keen between the California maker and the Eastern mills, and prices are none too strong. Wire nails are still being quoted at $3.20 per keg, Seattle delivery, in carloads of 80,000 lb.

Sheets.—A fair amount of business is moving in annealed and galvanized, but black sheets are quiet. Prices are weak, due to anxiety of some Eastern mills for orders. Blue annealed are held at 2.30c., No. 28 black at 3.15c., and galvanized at 4.25c., Pittsburgh, to which 61 cents freight must be added for Seattle delivery.

Steel Bars.—The local market is now regarded as firm at 2.35c., Seattle, and local sales managers of Eastern mills have instructions not to accept a lower price. The local mill is also naming that price. There is a fair demand for reinforcing bars which are firm at 2.60c. to 2.65c., Seattle delivery. We quote hoops and bands at 2.90c., Seattle delivery. In steel shafting small sales are reported on the basis of 2.50c., Pittsburgh, equal to 3.11c., for Seattle delivery.

Old Material.—There is practically nothing doing in the local market, and prices are largely nominal.

Warehouse Prices, f.o.b. Seattle

	Base per Lb.
Structural shapes	3.35c.
Steel bars	3.35c.
Plates, tank quality	3.25c.
Hoops	5.00c.
Bands	4.25c.
Reinforcing bars	3.25c.
Machine steel	3.75c.
Common wire nails, base per keg	$3.50
Cement coated nails, base per keg	3.00

Suspensions for Repairs Cut Youngstown Output

YOUNGSTOWN, July 6.—Rolling mill operations declined this week in the Mahoning and Shenango Valleys, due to the holiday observance and suspensions for semi-annual repairs. Only those departments requiring continuous operation, such as blast furnaces and by-product coke ovens, were maintained over Sunday and Monday.

Of 53 independent open-hearth furnaces in the Mahoning Valley, 30 were scheduled to resume Tuesday, with Bessemer plants to operate at 50 per cent. Eighty of 127 Valley sheet and jobbing mills are scheduled for this week's operation.

Independent bar mill capacity is active at 60 per cent, with Carnegie Steel Co. bar mills at 70 per cent. Pipe and skelp mill departments were little affected by the week's retardation, with 14 of the district's 18 tube mills under power.

Greater Foundry Activity Expected at Detroit

DETROIT, July 6.—Most of the melters in the district having covered for their pig iron requirements for the next three months, attention is being turned toward production schedules, which in automotive lines are on a good basis. Anticipated new models during the next 30 days means a heavy foundry production this month.

The following prices are quoted on a gross ton basis f.o.b. producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting and shoveling steel	$13.25 to $13.75
Borings and short turnings	9.00 to 9.50
Long turnings	7.75 to 8.25
No. 1 machinery cast	17.00 to 18.00
Automobile cast	21.50 to 22.50
Hydraulic compressed	11.00 to 11.50
Stove plate	13.50 to 14.50
No. 1 busheling	11.25 to 11.75
Sheet clippings	7.00 to 7.50
Flashings	10.25 to 10.75

New Pig Iron Firm in Chicago

Nicholas & Miller, McCormick Building, Chicago, is the style of a partnership formed by Robert C. Nicholas and John W. Miller, heretofore identified with Walter Wallingford & Co. in that city. The new firm retains the same organization and the same agencies for the sale of pig iron and ferroalloys in the Chicago territory as its predecessor.

Mr. Nicholas is a native of Cincinnati and has been associated with Walter Wallingford & Co. since its organization. He has been manager of the Chicago office ever since it was opened. Mr. Miller also was born in Cincinnati and was educated at the University of Pennsylvania. During the World War he was a first lieutenant with the American expeditionary forces in Italy and the Balkans. He has been connected with the Chicago office of Walter Wallingford & Co. since 1919.

Suspends Increased Rates on Wire Rods

WASHINGTON, July 6.—The Interstate Commerce Commission suspended from July 7 until Nov. 4 the operation of schedules proposing to increase the rates on wire rods in carloads from Cincinnati and other Ohio River crossings when from beyond to Southern destinations, particularly to Knoxville, Tenn. Illustrative of the tariffs is the proposal to increase from $3.19 to $6.94 per gross ton the rate from Cincinnati to Knoxville.

FABRICATED STEEL

Structural Awards Continue at Fairly High Rate —Inquiry Also Is Active

Considering the interruption of a triple holiday, structural steel awards in the week were fairly high, totaling upward of 25,000 tons and inquiries coming into the market reached nearly 20,000 tons. The largest award was 7800 tons for the Salmon Tower Building, New York. Among pending projects are three of fair size—4000 tons for a New York hotel, 4000 tons for a manufacturing plant at Dayton, Ohio, and 3500 tons for a fur exchange in Chicago. Awards follow:

NEW YORK, 5922 tons in the following awards reported to the Structural Steel Board of Trade: Apartment building, 660 Park Avenue, garage, 521 West Thirty-ninth Street, office building, Willoughby Avenue and Pearl Street, Brooklyn, and office building, 285 Schermerhorn Street, to Hedden Iron Construction Co.; loft building, 150 West Twenty-eighth Street, loft building, 508 West Twenty-sixth Street, St. Theresa's Church, Brooklyn, and high pressure pumping station for Brooklyn Union Gas Co., to McClintic-Marshall Co.; 15-story loft building, 11-13 West Thirtieth Street, to A. E. Norton, Inc.; 16-story loft building, 257 West Thirty-eighth Street, to Paterson Bridge Co.; motion picture theater, Richmond Hill, to George A. Just Co.

NEW YORK, 7800 tons, Salmon Tower, 11-13 West Forty-second Street, by Post & McCord, general contractors, to McClintic-Marshall Co.

NEW YORK, 700 tons, Caesar Theater, West Forty-fourth Street, to Hedden Iron Construction Co.

PHILADELPHIA, 500 tons, National Bank of North Philadelphia, to American Steel Fabricators.

BUFFALO, 300 tons, coke ovens for Semet-Solvay Co.

POUGHKEEPSIE, N. Y., 1600 tons, superstructure for Hudson River Bridge, to Riter-Conley Co.

BOSTON, 2800 tons, Keith Theater, to New England Structural Co.

CINCINNATI, 175 tons, building for William Powell Co., to Southern Ohio Iron Works, Cincinnati.

DAYTON, 900 tons, laboratory at Wright Flying Field, to J. E. Moss Iron Works.

SAGINAW, MICH., 200 tons, bridge over Tittabawassee River, to American Bridge Co.

NEW YORK CENTRAL LINES, 500 tons, bridge girders, to Jones & Laughlin Steel Corporation.

TOLEDO, OHIO, 700 tons, building for Blade Newspaper Co., to American Bridge Co.

CHICAGO, 400 tons, columns for apartment building, 25 East Delaware Place, to Hansell-Elcock Co.

LOCKPORT and MARSEILLES, ILL., 150 tons, buckle plates and eye-bars for locks, Illinois Waterway Commission, to Independent Bridge Co.

MILWAUKEE, 100 tons, branch house for Mack International Motor Truck Co., to Milwaukee Bridge Co.

MENASHA, WIS., 120 tons, mill building for Gilbert Paper Co., to Lakeside Bridge & Steel Co.

ST. PAUL, MINN., 100 tons, building for Seeger Refrigerator Co., to Lakeside Bridge & Steel Co.

CLOQUET, MINN., 100 tons, addition for Northwest Paper Co., to Lakeside Bridge & Steel Co.

MIAMI, FLA., 400 tons, 1,000,000-gal. elevator water tank, to Chicago Bridge & Iron Works.

LAKE CHARLES, LA., 200 tons, wharf sheds for harbor and terminal district, to unnamed fabricator.

STOCKTON, CAL., 500 tons, Medico-Dental Building, to Palm Iron Works, Sacramento, Cal.

BRAWLEY, CAL., 190 tons, Shippers' Hotel, to Moore Dry Dock Co., Oakland, Cal.

ELDORADO COUNTY, CAL., 125 tons, two railroad bridges for Northern California Redwood Co., to Moore Dry Dock Co.

LOS ANGELES, 130 tons, steel tank for the city of Los Angeles, to Western Pipe & Steel Co. of California.

TACOMA, WASH., 375 tons, bridge for Northern Pacific Railroad Co., to American Bridge Co.

SUMNER, WASH., 150 tons, bridge for Northern Pacific Railroad Co., to American Bridge Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

NEW YORK, 4000 tons, New Netherland Hotel, Fifth Avenue and Fifty-ninth Street.

NEW YORK, 300 tons, motion picture theater, Jerome Avenue.

JERSEY CITY, 1500 tons, viaduct, New Jersey Highway Commission.

ALBANY, N. Y., 400 tons, garage, International Motor Corporation.

ALBANY, 1500 tons, hotel.

WILLIAMSON, W. VA., 550 tons, machine shop, Norfolk & Western Railway.

VIRGINIA, 500 tons, Norfolk & Western bridge.

TAMPA, FLA., 2000 tons, convent.

KNOXVILLE, TENN., 500 tons, Tennessee Terrace Hotel; Nashville Bridge Co., low bidder.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS RAILROAD, 600 tons, bridges; bids in.

DAYTON, OHIO, 4000 tons, buildings for Delco Light Co.; bids close this week.

CHICAGO, 3500 tons, Fur Exchange, Michigan Boulevard, south of Boulevard bridge.

MICHIGAN, 125 tons, Michigan State Highway Department, four highway bridges.

RACINE, WIS., 500 tons, Strauss bascule span over Root River; Milwaukee Bridge Co., low bidder, at $296,980. Award made July 6.

LOS ANGELES, 500 tons, State armory, Exposition Park, Minneapolis Steel & Machinery Co., low bidder.

LOS ANGELES, 275 tons, Osteopathic Hospital, McClintic-Marshall Co., low bidder.

Railroad Equipment

The Inland Steel Co. has ordered a 60-ton oil electric locomotive for its Indiana Harbor plant from the American Locomotive Co., the Ingersoll-Rand Co. and the General Electric Co.

The Rock Island Lines have placed 188 50-ton composite coal car bodies with the Bettendorf Co.

The Great Northern will build 1000 box car underframes at its shops at Superior, Wis., but has withdrawn its inquiries for 2200 additional underframes.

The Erie has ordered 15 coaches from the Standard Steel Car Co.

The Union Pacific has ordered 10 gas electric motor cars from the Electro Motive Co.

The Seaboard Air Line has placed 15 express cars with the American Car & Foundry Co. and 32 express cars with the Pullman Car & Mfg. Corporation.

The Lehigh Valley has ordered 1 combination gas electric mail, baggage and smoking car, 1 combination gas electric baggage and smoking car, 4 passenger trailers, 1 baggage and express trailer and 2 passenger and smoking car trailers from the Brill Corporation.

The Pullman Car & Mfg. Corporation is building 50 sleeping cars which the Chicago, Milwaukee & St. Paul has leased for its Olympian and Columbian trains.

The Georgia & Florida Railway has bought 450 to 500 box cars from the American Car & Foundry Co. The same railroad is inquiring for 25 gondola cars.

The Hainesport Mining & Transportation Co. has ordered 10 hopper cars of 60 tons capacity from the American Car & Foundry Co.

The L. J. Breed Equipment Co., James Building, Chattanooga, Tenn., has inquiries out for a number of steel underframe flat or box cars, 50 ft. long.

The Fruit Growers Express has inquired for 400 car underframes. It recently bought 400.

The Chicago, Burlington & Quincy is inquiring for 300 car underframes.

The Chicago, St. Paul, Minneapolis & Omaha has ordered 8 Mikado type locomotives from the American Locomotive Co.

The Colorado & Southern is inquiring for 50 underframes for flat cars.

Darling & Co., Chicago, are in the market for 8 to 10 50-ton box cars.

The Gulf Refining Co. is inquiring for 30 gondola cars.

The tariff rate on scaling hammers, operated by pneumatic compressed air and used for scaling rust off steel, is put at 30 per cent ad valorem under the provision in paragraph 372 of the tariff law for "machines or parts thereof." Sustaining a protest made by the American Shipping Co., New York, the United States Customs Court has handed down the ruling here quoted. The merchandise had been returned by the customs appraising officers as manufactures of metal and duty imposed at the rate of 40 per cent ad valorem under paragraph 399.

An export order of exceptional size for die blocks recently was secured by the Union Electric Steel Corporation, Carnegie, Pa. It calls for 1000 blocks, each of 800 lb. They are to be sunk in this country prior to shipment.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	June 30	July 1	July 2	July 3	July 6
Lake copper, New York	14.00	14.00	14.00	14.00	14.00
Electrolytic copper, N. Y.*	13.62½	13.57½	13.62½	13.62½	13.62½
Straits tin, spot, New York	61.25	61.75	61.75	.....	62.62½
Lead, New York	8.25	8.25	8.25	8.25	8.25
Lead, St. Louis	8.00	8.00	8.00	8.00	8.00
Zinc, New York	7.55	7.55	7.55	7.55	7.57½
Zinc, St. Louis	7.20	7.20	7.20	7.20	7.22½

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, July 6.—Pronounced dullness has pervaded nearly all the markets the past week, due largely to the Independence Day holidays and the opening of the new month. Prices in nearly all metals have been fairly steady.

Copper.—The week has been without feature and there has been very little buying. Electrolytic copper was obtainable a few days ago at 13.82½c. to 13.87½c., delivered, but only a little was available at the concession from 13.87½c., which has been the quotation both before and since. Today the market is a little more active so far as inquiry is concerned and early in the day some producers were asking 13.90c. to 13.95c., delivered. No sales are noted at these levels and the market is still quotable at 13.87½c., delivered. Lake copper is quoted at 14c., delivered.

Copper Averages.—The average price of Lake copper for the month of June, based on daily quotations in THE IRON AGE, was 14.01c., delivered. The average price of electrolytic copper was 13.64c., refinery, or 13.89c., delivered.

Tin.—Total sales for the week have been small, about 700 tons having changed hands. The market is sluggish and there has been no anxiety to buy or sell. In the sales that have been made, consumers participated only slightly, but dealers were quite active. The principal feature was the publication of the June statistics which showed a substantial decrease in the world's visible supply. At the end of June the total was 15,831 gross tons, as compared with 18,045 tons at the end of May, a decrease of 2214 tons. This was a larger decrease than expected and is regarded as a bullish factor. Deliveries of tin in June for consumption were 6900 tons, and the quantity in stock and landing on June 30 was 2409 tons. The market here today has been dull with spot Straits tin quoted at 62.62½c., New York, nominal. The London market today was fairly strong with spot standard quoted at £277, future standard at £277 5s. and spot Straits at £286 per ton. The Singapore market was £283 10s. today.

Lead.—There have been practically no developments in this market during the week. A fair business has been done and premiums have practically disappeared in the outside market. The leading interest is understood to be booking business quite liberally at its contract price, 8.25c., New York. In the outside market quotations range from 8c. to 8.10c., St. Louis.

Zinc.—The market has been steady with the quotation practically pegged at 7.20c., St. Louis, at which level some business, particularly with galvanizers, is reported as having been booked quietly. Today the market is a little more active as to inquiry and sellers' ideas of prices are a little higher, quotations ranging from 7.22½c. to 7.25c., St. Louis, or 7.57½c. to 7.60c., New York.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. with shot nickel at 36c. per lb. Electrolytic nickel is obtainable at 39c. per lb.

Antimony.—Chinese metal for spot delivery is quoted at 14c., New York, duty paid, in a market which is quiet but firm. Future shipments from China are quoted at 12.75c. to 13.50c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 27c. to 28c. per lb., delivered.

CHICAGO, July 6.—A fair amount of business in lead has been negotiated in the past week, and prices have advanced. Buyers are impressed with the fact that the visible supplies of lead are low, pointing to the possibility of considerably higher prices. Tin has declined slightly in a spotty market, and the other metals re-

Metals from New York Warehouse

Delivered Prices per Lb.

Tin, Straits pig	63.00c. to 64.00c.
Tin, bar	66.00c. to 67.00c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.75c.
Zinc, slab	8.00c. to 8.50c.
Lead, American pig	8.75c. to 9.25c.
Lead, bar	11.00c. to 12.00c.
Antimony, Asiatic	14.00c. to 15.00c.
Aluminum, No. 1 ingot for remelting (guaranteed over 99 per cent pure)	30.00c. to 30.50c.
Babbitt metal, commercial grade	30.00c. to 35.00c.
Solder, ½ and ½ guaranteed	39.00c.

Metals from Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	68.00c.
Tin, bar	70.00c.
Copper, Lake	15.00c.
Copper, electrolytic	15.00c.
Copper, casting	14.00c.
Zinc, slab	8.40c.
Lead, American pig	9.00c.
Antimony, Asiatic	16.50c.
Lead, bar	11.00c.
Babbitt metal, medium grade	22.00c.
Babbitt metal, high grade	72.50c.
Solder, 50-50	40.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

Sheets—	
High brass	18⅞c. to 19⅞c.
Copper, hot rolled	22½c. to 23½c.
Copper, cold rolled, 14 oz. and heavier	24¾c. to 25¾c.
Seamless Tubes—	
Brass	23½c. to 24½c.
Copper	24¼c. to 25¼c.
Brazed Brass Tubes	26⅞c. to 27⅞c.
Brass Rods	16⅝c. to 17⅝c.

From New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks	12.75c.
Zinc sheets, open	13.25c.

Non-Ferrous Rolled Products

Mill prices in brass, bronze and copper products are unchanged. Lead full sheets were advanced June 17 ½c. to ¾c. per lb.

List Prices Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. Per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.87½c.
Copper, hot rolled	22.50c.
Zinc	11.25c.
Lead (full sheets)	12.00c. to 12.25c.
Seamless Tubes—	
High brass	23.50c.
Copper	24.25c.
Rods—	
High brass	16.62½c.
Naval brass	19.37½c.
Wire—	
Copper	15.87½c.
High brass	19.37½c.
Copper in Rolls	21.37½c.
Brazed Brass Tubing	26.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of the Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	37.50c.
Tubes, base	48.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	18⅞c. to 19⅞c.
Copper, hot rolled	22½c.
Copper, cold rolled, 14 oz. and heavier	24¾c.
Zinc	12.00c.
Lead, wide	11.08c.
Seamless Tubes—	
Brass	23½c. to 25c.
Copper	24¼c. to 25¾c.
Brazed Brass Tubes	26⅞c. to 29½c.
Brass Rods	16⅝c.

main unchanged. The old metals have shown no change in price since last week. We quote, in carload lots, Lake copper, 14.12½c.; tin, 62.50c.; lead, 8.25c.; zinc, 7.30c.; in less than carload lots, antimony, 15c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 9c.; yellow brass, 7.75c.; lead pipe, 7c.; zinc, 5c.; pewter, No. 1, 35c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 17.75c., all being dealers' prices for less than carload lots.

Receiver Appointed for Dominion Iron & Steel Co.

TORONTO, July 5.—The appointment of a receiver for the Dominion Iron & Steel Co., whose mills are located at Sydney, N. S., was suggested by Roy M. Wolvin, president, in the course of his statement at the annual meeting of the British Empire Steel Corporation, held in Montreal, June 30. Mr. Wolvin said this step was recommended in the best interests of the industry, to conserve the working capital of the company, to discontinue bond payments and to protect the interests of all concerned. The company was badly affected by the strike of miners last year, and the earnings during that period were reported to have been practically nil.

Discussing the affairs of the Nova Scotia Steel & Coal Co., another subsidiary of British Empire Steel Corporation, Mr. Wolvin said that bond and debenture interest, due July 1, would be postponed. He stated also that until the tariff was properly adjusted, there could not be prosperity in the coal, steel and iron industry in Nova Scotia. No new ships could be profitably constructed at the Halifax shipyards, owned by the British Empire Steel Corporation, because it had not been able to meet the lower European prices.

In the course of his analysis of the condition of the Dominion Iron & Steel Co., Mr. Wolvin claimed the company had assets and other receivables to the value of $13,245,864, as compared with liabilities of $4,468,464, but bank loans were over $3,000,000.

The meeting adopted the recommendation for the appointment of a receiver for the Dominion Iron & Steel Co. After some opposition the old board of directors of the British Empire Steel Corporation was reelected.

The application of the National Trust Co., Ltd., Toronto, Ont., trustees for the bondholders of Dominion Iron & Steel Co., for a receiver and manager for that concern, was granted at Halifax, N. S., July 2.

Foundrymen Nomihate Officers

Nominations for new officers of the American Foundrymen's Association for the coming year have been announced as follows by the nominating committee:

President, to serve for one year, S. W. Utley, vice-president and general manager Detroit Steel Casting Co., Detroit; vice-president to serve one year, S. T. Johnston, vice-president S. Obermayer Co., Chicago.

Directors to serve three-year terms each, Martin W. Henley, vice-president Frazer & Jones Co., Syracuse, N. Y.; N. K. B. Patch, secretary and works manager Lumen Bearing Co., Buffalo; A. B. Root, Jr., mechanical engineer Hunt-Spiller Mfg. Corporation, Boston; S. C. Vessy, president W. W. Sly Mfg. Co., Cleveland; L. C. Wilson, vice-president and general manager Federal Malleable Co., West Allis, Wis.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators, and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	11.75c.	13.25c.
Copper, heavy and wire	11.25c.	12.25c.
Copper, light and bottoms	9.75c.	11.00c.
Brass, heavy	7.25c.	8.75c.
Brass, light	6.25c.	7.75c.
Heavy machine composition	8.75c.	10.00c.
No. 1 yellow brass turnings	8.25c.	9.00c.
No. 1 red brass or composition turnings	8.00c.	9.00c.
Lead, heavy	7.25c.	7.50c.
Lead, tea	5.50c.	6.25c.
Zinc	4.25c.	4.75c.
Sheet aluminum	17.00c.	19.00c.
Cast aluminum	17.00c.	19.00c.

Elyria Iron & Steel Co. Buys Tube Plant at Toledo

The Elyria Iron & Steel Co., Cleveland, has completed negotiations for the purchase of the Standard Steel Tube Co., Toledo, Ohio, which will mean the merger of two leading manufacturers of welded steel tubing. The Toledo plant will be purchased by a new company to be known as the Elyria Iron & Steel Realty Co., all the capital stock of which, except qualifying directors' shares, will be owned by the Elyria Iron & Steel Co., and the latter company will lease the Toledo plant. Bonds to the amount of $450,000, bearing 6 per cent interest, will be issued by the Elyria Iron & Steel Realty Co. under a trust agreement to the Union Trust Co., Cleveland, and will be secured by a first mortgage on the Toledo plant. The income from the lease to the Elyria Iron & Steel Co. will provide for the annual requirements for the payment of interest and retirement of the principal of the bonds. The bonds will mature in equal annual installments to July 1, 1936.

The Elyria Iron & Steel Co. has been engaged in business since 1902, and, in addition to manufacturing tubing, makes hot and cold rolled strip steel and stampings. It has plants in Cleveland and Elyria, Ohio, and in Guelph, Ontario. It has 3874 shares of 7 per cent preferred stock and 47,568 shares of common stock, par $25. The stock on May 31 had a total book value of $3,584,670. Its net profit after depreciation and Federal taxes in 1925 was $577,778. Hugh B. Wick is president.

The Standard Steel Tube Co. has been in operation in Toledo since 1903. Its plant valuation is placed at $624,418. Its average net earnings after depreciation and Federal taxes during the past ten years have amounted to $104,842.

To Build Fabricating Plant in Chicago

The elimination of the "Pittsburgh plus" system and the establishment of Chicago as a basing point for steel in the West has brought another large steel fabricating unit into the Chicago district. The Mississippi Valley Structural Steel Co., with large fabricating plants at Decatur, Ill., and at St. Louis, has announced its intention of constructing a large fabricating plant at Chicago. The Chicago plant, to be located in Melrose Park on an 18-acre tract recently purchased, will represent an expenditure of $750,000, and with the plants at Decatur and St. Louis will give the company an annual output of 50,000 tons.

Inland Company Increases Coke Capacity

The Inland Steel Co., Chicago, has completed two batteries of Koppers by-product coke ovens, embracing a total of 74 ovens, at its No. 2 plant at Indiana Harbor, Ind. It now has a total of 204 by-product ovens, including 130 old ovens. The electrification of the mills in its No. 1 plant is still in progress and will not reach completion for several months.

PERSONAL

Floyd Rose, for the past seven years secretary and general manager of sales Heppenstall Forge & Knife Co., Pittsburgh, resigned that position as of July 1 to become vice-president Vanadium Alloys Steel Co., Latrobe, Pa. Mr. Rose has had an experience of 30 years in the production and sale of high-grade steels and forgings. Shortly after graduation from the University of Pittsburgh, in 1896, he entered the employ of the Carbon Steel Co. He was assistant general superintendent of the company in 1907, when he resigned to become general superintendent Portsmouth Steel Co., now the Portsmouth works, Wheeling Steel Corporation, Portsmouth, Ohio. In 1909 he returned to Pittsburgh to engage in metallurgical and inspection engineering under the firm name of Floyd Rose & Co. During American participation in the World War, Mr. Rose was in the Pittsburgh district ordnance office in charge of production of gun forgings at the plants of Heppenstall Forge & Knife Co., Carbon Steel Co. and Edgewater Steel Co. At the conclusion of the war he became identified with the Heppenstall company. Measuring the esteem of his former associates and the good will that goes with Mr. Rose to his new connection, he was given a farewell dinner by the Heppenstall company on June 24 and was given a valuable watch. Those present were the executives, department heads and district salesmen of the company.

FLOYD ROSE

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L. F. Kuhman has been appointed vice-president and director of the Andrews-Bradshaw Co., Pittsburgh, handling the Tracy steam purifier and Tracyfier gas and vapor scrubber. Mr. Kuhman has been associated with the company for the past three and a half years. For eight years prior to that time he was sales engineer for the Ingersoll-Rand Co. in the Pittsburgh district. He was educated at the Carnegie Institute of Technology.

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Samuel Soss, sales manager Soss Mfg. Co., Brooklyn, N. Y., has returned from an extended trip through the Middle West, surveying conditions to determine prospects for the last half of the year. His optimism is substantiated by numerous interviews with men of the automobile industry, who state that the last half of the year should exceed that of the same period of 1925.

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Raymond Fink, who has been vice-president of Pierce, Butler & Pierce Mfg. Corporation, New York, maker of heating apparatus, has joined the executive staff of the Sherman Corporation, engineer, 31 Milk Street, Boston.

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Joseph S. McGrath has been appointed chief of the minerals section of the Department of Commerce, succeeding Homer S. Fox, who recently was appointed Trade Commissioner, at London.

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B. M. Horter, formerly of the Philadelphia office of the Cutler-Hammer Mfg. Co., has been appointed manager of the Boston office, effective July 1. He succeeds J. M. Fernald, who has resigned to enter a different field of business. Mr. Horter has been with the company since March, 1916. At one time he was manager of the Wilkes-Barre office, which since has been discontinued. During the war he served on a submarine chaser.

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Leonard Peckitt, president Replogle Steel Co., New York, sailed on the Mauretania last week for a trip to France, Germany and England, including a visit to his old home in Yorkshire.

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Joseph O'Neill has been appointed manager of advertising and sales promotion for the Imperial Electric Co., Akron, Ohio, manufacturer of a.c. and d.c. motors and generators. He makes the change from the Goodyear Tire & Rubber Co., where he was department manager, in several merchandising projects, for the past 10 years.

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William J. Butler has been appointed salesman by the Bridgeport Brass Co., Bridgeport, Conn., for flush valves, brass pipe and tubular plumbing goods, calling on architects, jobbers and plumbers in northern New England. Mr. Butler will make his residence in Boston.

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Frank F. Chiles has joined the sales organization of the McKinney Steel Co., Cleveland, and will devote his attention to the steel bar sales department. Previously he spent 24 years on the sales force of the Carnegie Steel Co., 18 years of that time as sales representative in the company's northern Ohio territory, with headquarters in Cleveland.

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R. H. Clarke, vice-president, and Ludwig Kemper, treasurer, of the Otis Steel Co., were added to the board of directors at a meeting of the stockholders on June 30.

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Joseph V. Smith, general manager shovel interests for Hubbard & Co., Pittsburgh, relinquishes that position as of July 1. The company's Pittsburgh shovel plant recently was destroyed by fire and, instead of rebuilding, it has been decided to concentrate the production of shovels at Montpelier, Ind. This change would have entailed Mr. Smith's removal to Montpelier and a desire on his part, for family reasons, to remain in the East led him to resign. He expects later to engage in the manufacture of hardware lines. Mr. Smith was with Oliver Brothers, Inc., for 16 years, starting as an office boy in the New York office and becoming manager of the Pittsburgh office in 1910. In 1915 he resigned to go with Hubbard & Co. as general manager of the shovel interests. He is a member of the American Hardware Manufacturers' Association. As chairman of the simplification committee of the American Shovel Institute he played a prominent part in the formulation of the new standards, which went into effect on July 1.

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Edwin Bates, Summerfield, Ohio, has been appointed as domestic marketing specialist in the Domestic Commerce Division of the Bureau of Foreign and Domestic Commerce, Washington.

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W. J. Adamson resigned, effective July 1, from the sales department of the Trumbull Steel Co., Warren, Ohio. He served the company in various capacities, and was at one time assistant to A. N. Flora, vice-president in charge of sales. Mr. Adamson will locate in Chicago.

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Arthur Dorman, managing director, and D. L. Johnson, a director, of Dorman, Long & Co., Middlesbrough, England, and E. D. Morgan, manager of the company's Port Clarence works, returned home on the Homeric, sailing July 1. They had spent about three weeks inspecting iron and steel plants in Birmingham, Chicago, Cleveland, Pittsburgh and Bethlehem. The

Dorman company, one of the largest pig iron and steel companies in England, employs about 25,000 men.

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William T. Shepard, former partner of Rogers, Brown & Co., and resident vice-president of Rogers, Brown & Crocker Brothers, Inc., in Buffalo, has retired from the latter corporation. R. T. Melville, for many years with Rogers, Brown & Co. in a selling capacity and likewise with its successor, Rogers, Brown & Crocker Brothers, Inc., has been appointed resident manager of the latter corporation, with offices at 316 Erie County Bank Building, Buffalo.

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Illmari Rainesalo, for the past four years chief engineer Ames Iron Works, Oswego, N. Y., has resigned and on Aug. 7 will sail on the new Diesel motorship Dripsholm for Helsingfors, Finland, where he has become general manager of the Finnish Electric Co. foundry. This is one of the largest plants in Helsingfors, making a specialty of electrical equipment. He will be succeeded by I. B. Cuppernoll, Oswego, N. Y., formerly in charge of the purchasing department. Mr. Cuppernoll's place will be filled by Fred Maxon, who has been in the accounting department. The change will become effective July 22, according to Joseph A. Bohn, plant manager.

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N. E. Craig, who has been connected with the Pittsburgh office of Hickman, Williams & Co., pig iron merchants, has been appointed to the sales staff of the New York office, 120 Broadway.

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Seth Marshall has been elected a director of the Zenith Furnace Co., Duluth, Minn., succeeding his father, the late A. M. Marshall. The following directors were re-elected: C. W. Andrews, F. A. Brewer, C. A. Luster, W. P. Chinn, H. S. Pickands, W. B. Castle, Seymour Wheeler and R. S. Dutton.

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William G. Praed, assistant superintendent Link Belt Co., Indianapolis, has been elected chairman for the next year of the Indianapolis chapter American Society for Steel Treating. Carleton B. Edwards, chemical engineer Republic Creosoting Co., Indianapolis, becomes vice-chairman and Clarence H. Beach, district sales manager Bliss & Laughlin, Inc., 1412 Merchants Bank Building, Indianapolis, secretary-treasurer.

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William Wuthenow, for many years manager of Western plants of the Republic Iron & Steel Co. at Chicago, and more recently president Republic Rolling Mill Corporation, Chicago, has opened an office in the Tribune Tower, Chicago, for the sale of iron and steel scrap. His resignation from the Rolling Mill presidency was noted in our April 1 issue.

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Joseph Ghandy, assistant general superintendent Tata Iron & Steel Co., Jamshedpur, India, who is in this country on a tour of American steel plants, was in Pittsburgh recently. F. K. Bennett, superintendent of rolling mills of the company, who is on leave, is accompanying Mr. Ghandy on many of his plant visits.

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W. E. Kettering, secretary-treasurer New Metal Products Co., Emeryville, Cal., and formerly sales manager of the Steel Tank & Pipe Co., Berkeley, Cal., has resigned from the latter company and has accepted a position as sales manager of the Berkeley Steel Construction Co., Berkeley, Cal. Plans are being prepared by this company for a new plant in the industrial district of Berkeley.

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W. S. Jones has resigned as vice-president and director of the Vanadium-Alloys Steel Co., Latrobe, Pa., maker of high-speed carbon and alloy tool steels.

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MacDonald C. Booze, senior fellow of the American Refractories Institute's Fellowship, which is maintained at Mellon Institute of Industrial Research, Pittsburgh, has resigned from that activity and has accepted a position with the Charles Taylor Sons Co., Cincinnati, as vice-president in charge of research and development. Mr. Booze has been active in the refractory industry for some time and has contributed valuable information pertaining to refractories and their uses. Until last April he was secretary American Refractories Institute, Pittsburgh, his resignation from that position having been chronicled in our April 22 issue. Stuart M. Phelps, who for several years has been associated with Mr. Booze at Mellon Institute, has been appointed senior fellow of the Refractories Fellowship, effective July 1. Mr. Phelps has been doing research work for a number of years and is well fitted to take over this new position.

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F. F. Huber, who has been Chicago district sales manager of the Mansfield Sheet & Tinplate Co., Mansfield, Ohio, has been transferred to Cleveland as sales manager in the Cleveland territory, with office at 2002 Union Trust Building. J. A. Guyer, who has represented both the Mansfield company and the Interstate Iron & Steel Co., Chicago, in the Cleveland territory, will hereafter represent only the latter company and has moved his office to the Keith Building.

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George M. Dyke has been elected assistant secretary, Chain Belt Co., Milwaukee, manufacturer of concrete mixers, elevators, conveyors and chain under the trade name "Rex." Mr. Dyke is to fill the vacancy caused by the resignation of C. E. Stone, who becomes vice-president and general manager, Interstate Drop Forge Co. The two companies are affiliated. F. M. Lowum was elected assistant treasurer. Other officers of the Chain Belt Co. are C. R. Messenger, president; C. F. Messenger and J. C. Merwin, vice-presidents; Brint Welser, secretary; C. L. Pfeifer, treasurer, and William C. Frey, E. L. Wood, H. O. Seymour, and Donald Frazar, directors.

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Charles E. Stone, for several years assistant to the president, Chain Belt Co., Milwaukee, has been elected vice-president and general manager, Interstate Drop Forge Co., Milwaukee, manufacturer of commercial drop forgings. Mr. Stone was graduated from the University of Michigan in mechanical engineering in 1910 and spent several years with the Foos Gas Engine Co., first as engineer and later as purchasing agent. He joined the Chain Belt Co. in 1918 to take charge of its purchases. He has been active in the National Association of Purchasing Agents since its organization and was vice-president of the association in 1922. C. C. Bremer, who has been comptroller for the Interstate Drop Forge Co. for a number of years, was elected secretary. C. R. Messenger is president. Other directors are W. J. Nugent, president, Nugent Steel Castings Co., Chicago; C. F. Messenger, vice-president, Chain Belt Co., Milwaukee; L. S. Peregoy, vice-president, Sivyer Steel Castings Co.; William C. Frey, E. L. Wood and J. W. Milspaugh.

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J. Lo Pahong, general manager of the Wou-Ching Iron & Steel Works Co., Ltd., Shanghai, China, and associates visited steel plants in the Mahoning Valley during the past week. They were the special guests of Julius Kahn, president, Truscon Steel Co., which maintains an office in Shanghai, China.

Testimonial Dinner to R. W. Gillispie

A farewell dinner was given for R. W. Gillispie, Monday evening, June 28, at the Saucon Valley Country Club, Bethlehem, Pa., by members of the sales department and other officials of Bethlehem Steel Corporation prior to assumption of his new duties as vice-president of the Jeffrey Mfg. Co., Columbus, Ohio. About 35 were present, among whom were: E. G. Grace, president Bethlehem Steel Corporation; H. E. Lewis and Quincy Bent, vice-presidents; E. S. Knisely, general sales agent, and G. H. Blakeley, manager struc-

tural and plate sales department. Dr. Blakeley was toastmaster.

The first speakers were Quincy Bent and Neil Salsich, who had been associated with Mr. Gillispie for a longer period than any other persons at the dinner, and they were followed by E. S. Knisely, general sales agent for Bethlehem, who was Mr. Gillispie's immediate superior for ten years.

Compliments to Mr. Gillispie's ability and standing in the business world were paid him by President E. G. Grace and Vice-President H. E. Lewis. Mr. Grace dwelt upon Mr. Gillispie's remarkable record and splendid qualities, and expressed his warm personal interest which would always follow Mr. Gillispie's career.

As a token of the regard of his associates in the sales department, Mr. Gillispie was presented with a Hamilton watch with chain. Paul Mackall, who had been Mr. Gillispie's associate as assistant general sales agent since his coming to Bethlehem, made the presentation. Expressions of regret on Mr. Gillispie's leaving were received by telegram from Charles M. Schwab and other officers of the corporation who were unable to attend.

Mr. Gillispie has served 22 years with the Bethlehem interests. At the time of the acquisition of the Pennsylvania Steel Co. by Bethlehem in 1916, Mr. Gillispie, who was general manager of sales of that company, was made assistant general sales agent of the Bethlehem Steel Co. and transferred to Bethlehem. At the beginning of this year he was made assistant manager of the structural and plate sales department, which position he occupied at the time of his resignation.

OBITUARY

GEORGE A. ST. CLAIR, for many years identified with Lake Superior iron mining and prospecting, died at Duluth, June 19, aged 77 years. Mr. St. Clair's first connection with iron ore operations was as a weigher of ore at the Washington mine on the Marquette range. At 21 he was in charge of this mine and later operated the Winthrop mine on the same range. On the opening of the Mesaba range in 1892, he went to Minnesota and for a number of years following explored many parts of that range, having later to do with the development of the Sparta mine, in which he had a considerable interest, as well as of the Vega, Bangor, Malta and Adams mines. Mr. St. Clair gave a good deal of attention to the magnetites of the eastern Mesaba. In May, 1913, he read a paper on the "Ores of the Eastern Mesaba Range" at the New York meeting of the American Iron and Steel Institute. In the proceedings of the institute reproducing this paper the author was described as an "explorer for iron ore."

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GEORGE W. MACHLET, president American Gas Furnace Co., Elizabeth, N. J., died on June 25. He was born May 23, 1835, in Pforzheim, Baden, Germany; came to Newark, N. J., in 1870, and since 1874 has resided in Elizabeth. While still in Germany, he conceived the idea of gas-fired industrial furnaces utilizing blast air to entrain the gas; the reverse of the principle employed in the Bunsen system. In 1878 the American Gas Furnace Co. was established in Elizabeth and he became vice-president and factory manager, the late Major Edward P. Reichhelm being president until his death. The business in 1887 was incorporated with these two pioneers as president and vice-president and factory manager respectively. Upon the death of Major Reichhelm, in 1919, Mr. Machelt became president. He was also president of the American Metal Treatment Co., a corporation formed in 1907.

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E. GEORGE LAVINO, a member of the firm of E. J. Lavino & Co., Bullitt Building, Philadelphia, manufacturers of ferromanganese and dealers in other alloys, died Sunday, June 27, at his home in a suburb of Philadelphia. He was a son of E. J. Lavino, head of the firm. This was the second death in the Lavino family within a few weeks, a brother of E. J. Lavino having died recently. E. George Lavino was 45 years old. He was born in Smyrna, Asia Minor, and came to the United States when a child. He was a graduate of the University of Pennsylvania.

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KARL JACOB DEPREZ, secretary and sales manager Chambers Mfg. Co., fireless cookers, Shelbyville, Ind., died on June 18 in Dallas, Tex., after a brief illness. He was 33 years old, a native of Shelbyville, and had been connected with his company seven years.

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DEAN WILLIAM G. RAYMOND, of the College of Engineering at the University of Iowa, died at Iowa City, Iowa, on June 17. His death was attributed to heart trouble and pneumonia. Dean Raymond was sixty-eight years old and had been at the head of the Engineering College since 1905.

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HENRY C. M. THOMSON, president, American Hardware Corporation, New Britain, Conn., from 1913 to 1924, when ill health necessitated his retirement, died at his home in that city on Friday, June 18. He was born in New Haven, Conn., April 20, 1863. From 1884 to 1901 he was with the P. & F. Corbin Co., representing it in Chicago for 11 years. He then joined Hoggson Brothers, New York, as treasurer, and remained with them until he became president of the New Britain company.

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CHRISTOPHER WALLER PANK, vice-president MacWhyte Co., Kenosha, Wis., manufacturer of wire rope and cable, died suddenly of cerebral hemorrhage at his home in Evanston, Ill., on June 21. He was born in Canada and came to the United States at 18, taking a position as stenographer in the office of Fairbanks, Morse & Co., at Chicago. He rose to the position of vice-president and sales manager, retiring about three years ago to become associated with the MacWhyte Co., formerly the Macomber & White Co.

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CLIFTON LINCOLN LINGO, for the past 25 years traffic manager Inland Steel Co., Chicago, died on July 1 at Gary, Ind., at the age of 61. Mr. Lingo had suffered from a liver affection and heart disease for over a year and for the past six months had been confined to his home. Prior to going with the Inland Steel Co. he was for some time traffic manager of the Rogers-Brown Iron Co. at Chicago, and before that was identified with the traffic department of the Chicago & Eastern Illinois Railroad.

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HENRY CLEMENT, secretary of the Welsh Plate and Sheet Manufacturers Association, died on July 3, at the age of 72.

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JOSEPH HENRY FOSTER, Pawtucket, R. I., retired inventor and prominently identified with the tool and machinery industries for more than 60 years, died at his home on June 28, in his eightieth year. Funeral services were held on July 1.

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CLEVELAND HOADLEY DODGE, chairman of the board Phelps-Dodge Corporation, New York, died of pneumonia at Riverdale, N. Y., on June 24, at the age of 66. He was born in New York and was graduated from Princeton University in 1879, in the same class with Woodrow Wilson. He held many directorates in banking, railroad and sales organizations and was, until recently, president International Paper Co. His philanthropies were numerous and generous.

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J. F. STARK, secretary and treasurer Cumberland Steel Co., Cumberland, Md., died suddenly at his home in that city on July 3.

Strike Causes Tin Plate Shortage

Only 10 Per Cent Welsh Operation—American Product Supplies Some Users —Six Furnaces in Blast and Pig Iron Advances

(*By Cable*)

LONDON, ENGLAND, July 5.

THE pig iron market is strong, with an upward tendency. Stocks of foundry iron are almost exhausted. There is some demand for immediate needs, for which full prices are paid, but no interest is shown in forward business. Hematite supplies are diminishing, but there are still sufficient stocks to meet requirements. Probably only about six British furnaces of all kinds are now in blast. Foreign ore is stagnant, and the price of Bilbao Rubio is still nominal.

Finished iron and steel consumers are buying only bare necessities and production of heavy material has practically ceased.

The tin plate market is active for stock material, but forward buying is light. Both domestic and export consumers are clamoring for immediate delivery, as otherwise many will be forced to suspend operations. Some European packers have already closed their plants. Stock tin plate is being sold at 25s. 6d. per base box, f.o.b. Supplies of 20 x 28 in. tin plate are running low, but are expected to be augmented by the arrival of American material. About 10 per cent of the Welsh mills are operating at present, but several are resuming on foreign coal.

Galvanized sheets are dull, but makers are well booked with tonnage for delivery when the strike ends. The black sheet market is idle. As a result of the difficulty of securing prompt shipments, Japan has bought only a few small lots of galvanized sheets for indefinite delivery.

Continental markets are generally quiet except in semi-finished steel for prompt shipment. Prompt lots of billets are being sold by merchants at £4 10s. 6d. and sheet bars at £4 16s. 6d., both f.o.b. Antwerp. Makers are quoting September-October delivery on billets and sheet bars. The German Wire Rope Syndicate is now in operation.

BRITISH BUY IN LUXEMBURG

Merchants Increase Purchasing of Finished Steel and Small Business in Spot Semi-Finished Continues

LUXEMBURG, June 25.—While the decline in demand for semi-finished steel, as a result of the temporary withdrawal of British consumers from the market during the coal strike, has adversely affected many Luxemburg mills, there has been a slight gain by the appearance of British steel merchants in the Luxemburg market, purchasing small lots of bars and structural steel for prompt shipment.

Business with the Far East, which recently declined, continues small. Competition from Belgian, French and German mills is keen in all world markets, causing a slow downward movement of export prices. At the moment the most active competitor for foreign business is Germany. Throughout June, the rapid fluctuation of the franc in foreign exchange has been an obstacle to any improvement in business. Only at the latest sales in Brussels has any tendency toward stabilization of prices been apparent.

The agreement of Belgian, French and Luxemburg producers of pig iron is successfully maintaining prices and with demand continuing active the price is quite stable at 525 fr. per metric ton to domestic consumers of No. 3 phosphoric foundry iron.

Although the heavy purchasing by British mills of semi-finished steel that was a feature of the market prior to the coal strike has declined there is a heavy current demand from Britain for spot tonnages of billets, blooms and sheet bars, resulting in a tendency of the market to advance. For prompt shipment Thomas steel billets are bringing £4 6s. to £4 8s. per metric ton, blooms £4 1s. to £4 2s. and sheet bars £4 8s. to £4 12s., all f.o.b. Antwerp. The domestic market in these products is quiet. Steel bars are quoted at £4 14s. per metric ton and occasionally on sizable lots 6d. per ton concession is offered. Beams bring £4 11s. to £4 12s. and wire rods are unchanged at £5 5s. to £5 6s. per metric ton, f.o.b. Antwerp.

On May 31, there were 53 furnaces in blast in Luxemburg, the same number as on April 30. The average

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British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.86 per £ as follows:

Durham coke, del'd	£0	18	1½s.				$4.50		
Bilbao Rubio ore†	1	1		to £1	1¼s.		5.10	to	$5.16
Cleveland No. 1 fdy	4	6½	and	4	7*		21.02	and	21.14*
Cleveland No. 3 fdy	4	4	and	4	4½*		20.41	and	20.53*
Cleveland No. 4 fdy	4	3	and	4	3½*		20.17	and	20.29*
Cleveland No. 4 forge	3	3½	and	4	3*		15.19	and	15.32*
Cleveland basic (nom.)	3	15	and	3	15½*		18.23	and	18.35*
East Coast mixed	3	19	and	4	0*		19.19	and	19.44*
East Coast hematite	3	16	to	3	16½		18.46	to	18.58
Ferromanganese	15	0					72.90		
*Ferromanganese	14	0					68.04		
Rails, 60 lb. and up	6	15	to	7	5		32.80	to	35.24
Billets	6	0	to	7	10		29.16	to	36.45
Sheet and tin plate bars, Welsh	6	5					30.38		
Tin plates, base box	1	0½	to	1	5½		4.98	to	6.20
Black sheets, Japanese specifications	13	10	to	14	0		65.60	to	68.04
							C. per Lb.		
Ship plates	7	5	to	7	15		1.57	to	1.68
Boiler plates	9	5	to	11	0		2.00	to	2.39
Tees	7	10	to	8	0		1.62	to	1.73
Channels	6	15	to	7	5		1.46	to	1.57
Beams	6	10	to	7	0		1.41	to	1.51
Round bars, ¾ to 3 in.	7	12½	to	8	2½		1.65	to	1.77
Steel hoops	10	10	and	11	0*		2.28	and	2.39*
Black sheets, 24 gage	10	15	to	11	0		2.33	to	2.39
Galv. sheets, 24 gage	16	10					3.58		
Cold rolled steel strip, 20 gage	18	0					3.91		

*Export price.

†Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

Foundry pig iron: (a)									
Belgium	£3	6s.	to	£3	7s.		$16.03	to	$16.28
France	3	6	to	3	7		16.03	to	16.28
Luxemburg	3	6	to	3	7		16.03	to	16.28
Basic pig iron: (a)									
Belgium	2	16	to	2	17		13.60	to	13.85
France	2	16	to	2	17		13.60	to	13.85
Luxemburg	2	16	to	2	17		13.60	to	13.85
Coke	0	18					4.37		
Billets:									
Belgium	4	5	to	4	7		20.65	to	21.14
France	4	5	to	4	7		20.65	to	21.14
Merchant bars:							C. per Lb.		
Belgium	4	13	to	4	15		1.03	to	1.04
Luxemburg	4	13	to	4	15		1.03	to	1.04
France	4	13	to	4	15		1.03	to	1.04
Joists (beams):									
Belgium	4	12	to	4	14		1.01	to	1.03
Luxemburg	4	12	to	4	14		1.01	to	1.03
France	4	12	to	4	14		1.01	to	1.03
Angles:									
Belgium	5	2	to	5	4		1.12	to	1.15
⅛-in. plates:									
Belgium	5	12	to	5	16		1.23	to	1.27
Germany	5	12	to	5	16		1.23	to	1.27
¼-in. ship plates:									
Belgium	5	2	to	5	4		1.12	to	1.15
Luxemburg	5	2	to	5	4		1.12	to	1.15
Sheets, heavy:									
Belgium	6	3	to	6	4		1.35	to	1.37
Germany	6	3	to	6	4		1.35	to	1.37

(a) Nominal.

number of furnaces in blast during 1925 was 42 and the average of 1913 was 54, only one more than the present rate. Pig iron output totaled 299,630 tons, compared with 287,890 tons in April. Ingot production in May was 265,650 tons.

RAIL SYNDICATE FORMED

Agreement Reached at London Meeting of Makers Awaits Only Signatures—Export Markets Classified

PARIS, FRANCE, June 25.—At the meeting of European rail producers just held in London, all difficulties are understood to have been settled so that the agreement is ready for the signatures of the various mills which will compose the European Rail Makers Association. No serious obstacle apparently remains for the regulation of prices and export markets of the rail makers of Europe.

The greatest obstacle, surmounted at this meeting, was the contention of the British mills that their dominions and colonies were to be considered as their own domestic markets, not open to competition. At the meeting the British finally conceded something of the Continental claim that these were foreign markets, except for the right of British makers to a larger portion of this tonnage. In the final settlement, British mills retain the right of preference in supplying their possessions up to the limit of their producing capacity, which is determined on a quota basis, with the British quota increased by an additional 20,000 tons. Beyond the limit of this quota, other members of the association may furnish rails and track supplies.

Markets have been divided into three classifications, according to report. There is the inland market of each producer in which there may be no competition; there is a second class of markets, such as the British possessions, in which a certain producing country may claim preference but not exclusive rights; and there is a third class of genuine export markets the supplying of which is decided on the basis of a quota of participation of European and American producers.

The base price has been definitely set at £6 per metric ton, f.o.b. Antwerp, and the modification of the former price order, which permitted Belgian mills to sell at £5 17s. 6d. per metric ton, f.o.b. Antwerp, has been rescinded.

MORE GERMAN STEEL MERGERS

United Steel Works Seeks Syndicate Control—More State Control of Cartels Proposed

BERLIN, GERMANY, June 10.—Renewed agitation against the formation of large corporations and cartels is probably the result of reported efforts of the United Steel Works Co. to expand its holdings sufficiently to gain control of the Ingot Steel Syndicate, of which it is the most important member. To be effective the decisions of the syndicate must be supported by 75 per cent of the membership. Through its subsidiaries the United Steel Works Co. controls 42½ votes out of 100 in the syndicate, as well as 25 per cent of the total voting capacity in the Ruhr Coal Syndicate. Negotiations for the mergers necessary to 75 per cent control of the Ingot Steel Syndicate are reported in progress.

By these negotiations it is evidently proposed to acquire the steel, wire and other plants of the Stumm interests, which would bring the votes of the corporation up to 47 per cent. An effort is also reported being made to acquire the Charlottenhütte Co., or a large part of its holdings. This company is controlled by an associate of the late Hugo Stinnes. Other companies mentioned as having been approached with proposals to merge with the United Steel Works Co. are the Rombach Co., which has been in financial difficulties, and the Buderus Iron Co. Anti-trust laws similar to American legislation are unknown in Germany and two successive ministers of industry have expressed approval of the United Steel Works merger.

Formation of cartels seems to promise uninterrupted progress. In the Reichstag a bill is about to be introduced which would provide increased governmental control over the so-called "compulsory" syndicates. The potash syndicate is of a compulsory nature and the Ruhr Coal Syndicate, although not compulsory in theory, is in practice, as the Government recently exercised its special authority to force several outside coal corporations to join this syndicate. The Socialists in the Reichstag have moved to require the Government to submit a bill establishing a Cartels Board, which would be assisted by a committee of representatives of labor and employers. This board according to the motion would have wide powers, including the right to dissolve a cartel or to reduce its prices.

INCREASED GERMAN BOUNTY

To Makers of Finished Goods for Export—Materials Now Below Pre-War Prices

(*By Radio*)

BERLIN, GERMANY, July 6.—The iron and steel market is markedly active. The Steel Syndicate raised July's production ration to 67½ per cent of normal against 65 per cent in the past year.

Home prices are unchanged, but bounties granted by the Steel Syndicate on semi-finished materials and rolled goods used in manufacturing for export have been increased as a result of the new franc collapse. German exporting manufacturers are now getting materials much below pre-war prices.

Increased Production in May

Production in metric tons in May was as follows: Pig iron, 736,206 tons, against 668,203 in April. Steel ingots, 900,548 tons, against 806,805 tons in April. Rolled goods, 796,711 tons, against 744,706 tons in April.

EXPORT TIN PLATE BOOKED

British Strike Bringing Numerous Orders to American Mills—Importers of German Steel Cautious

NEW YORK, July 6.—Tin plate orders from British consumers, as a result of inability of British mills during the coal strike to make sufficiently prompt deliveries, are being booked by American mills. Recently, it is reported that between 1000 and 1200 tons (50,000 to 60,000 boxes) of tin plate were shipped by a large independent producer to Liverpool and London. Reports that American manufacturers of tin plate have shipped tonnages to British customers for the account of the British mills unable to deliver promptly are unconfirmed. While a sizable tonnage of tin plate business from foreign consumers is apparently piling up on the books of mills in the United States and occasional orders for sheets and special products are being booked, the majority of the steel business developing from the inability of British mills to manufacture is apparently going to Continental makers.

Importers in New York, with the exception of a few who are direct representatives of the mills in Germany, are still selling only small orders c.i.f., duty paid, being unwilling to accept the responsibility for payment of the duty on a large tonnage, should a countervailing duty finally be imposed. One direct representative of a German mill is quoting duty paid in all cases, the mill having authorized him to sell on this basis, the producer accepting the risk.

Japanese business continues small with less than the usual volume of inquiry in the market for tin plate. The Shibaura Engineering Co. in Japan has awarded 500 tons of electrical sheets to American mills, 300 tons through Mitsui & Co., New York, and 200 tons to the Takashimaya Co., New York.

Machinery Markets and News of the Works

BUYING FAIRLY ACTIVE

Quieter in Some Lines but Summer Tool Business Is Above Average

Southern Railway Inquiries for 28 Tools — Orders Placed by Illinois Central for Heavy Machines

UNCOMMONLY good business for this time of year indicates to the machine tool trade that the usual summer slump in buying may be less pronounced this year. With some companies June sales were exceptionally large, and there is a great deal of business outstanding, which, if closed soon, will insure a continuation of the present rate of operations through July and August.

The Bullard Machine Tool Co., Bridgeport, Conn., in a prepared statement, reports that its business for the first half of 1926 is considerably ahead of that for the corresponding period last year. This company's June sales were well up among the highest monthly totals ever booked. A large proportion of its orders have originated in the automotive industry, but a satisfactory condition of general business is reflected in the large volume received from all lines of manufacturing industry. A general upward trend in business is indicated, the company believes.

The Kearney & Trecker Corporation, Milwaukee, points to the high rate of orders for special tooling equipment as a sign of continued good business. "Several months before a depression can normally be detected," says this company's statement, "orders for special equipment start falling off. The fact that our production service department is today working at full capacity makes us very optimistic concerning the future."

Business of the past week has included more orders from the Illinois Central Railroad for heavy tools. The Chevrolet Motor Co., buying for its Toledo, Ohio, plant, has been one of the most active customers of the machine tool companies in the automotive field. The Timken Roller Bearing Co., Canton, Ohio, is inquiring for considerable equipment for a plant extension. The Southern Railway has issued an inquiry for about 28 tools.

New York

NEW YORK, July 6.

MACHINE tool buying continues fairly active for this season. A great many quotations are outstanding, and if a fair proportion of these develop into orders the machine tool business will continue through the summer months at an uncommonly good rate. The Illinois Central has placed quite a number of orders at Chicago. One Eastern company has sold this road within the last week a 90-in. locomotive axle lathe, a 90-in. wheel quartering machine, a 36-in. x 18-ft. engine lathe and a 10-ft. plate flanging clasp. The Lehigh & Hudson Railroad had bought an 8-ft. plate flanging clamp. Other miscellaneous tool orders of the week include the following: A jig borer to a Baltimore company, also one to a company at Rochester, N. Y.; a 16-in. geared-head lathe to a Philadelphia company; a 13-in. geared-head lathe to a Chicago buyer; a 20-in. geared-head lathe to a Muncie, Ind., manufacturer; three hand milling machines to a motor parts manufacturer in Minnesota; a vertical shaper to a company at Alliance, Ohio; two automatic milling machines to a lock manufacturer at Rockford, Ill.; an automatic lathe and an automatic centering machine to a company in Springfield, Ohio.

The Commercial Solvents Corporation, 17 East Forty-second Street, New York, will proceed with the immediate erection of the proposed addition to its plant at Peoria, Ill., where 17 acres has recently been acquired for the production of butanol and other industrial chemicals. It is reported to cost close to $1,000,000 including machinery. Stone & Webster, Inc., 147 Milk Street, Boston, is general contractor.

Joseph W. Roth, 1575-83 Sixtieth Street, Brooklyn, has applied for permission to equip a machine and automobile repair shop in the building noted, corner of Sixteenth Avenue.

The Commissioner of Highways, State Department of Public Works, Albany, N. Y., will soon begin the construction of a two-story equipment shop, with repair facilities, 70 x 185 ft., near Poughkeepsie, N. Y.

The New York Pie Baking Co., 82 Sullivan Street, New York, has filed plans for the construction of its proposed three-story plant, 225 x 276 ft., on Whitlock Avenue, near 141st Street, to include the installation of ovens, power equipment, conveying and other machinery, estimated to cost $250,000. C. B. Comstock, 110 West Fortieth Street, is architect.

Fire, June 24, damaged a portion of the plant of the Modern Stamping & Metal Co., Inc., 497-501 Houston Street, New York. An official estimate of loss has not been announced. The damage will be replaced.

The Teepe-Whitney Corporation, New York, organized with a capital of $300,000, of which $240,000 has been paid in, will take over and consolidate the plants and businesses of J. Charles Teepe, Inc., Nott Avenue, Long Island City, manufacturer of tables and other furniture, and the W. F. Whitney Co., South Asburnham, Mass., manufacturer of kindred products. Plans are under way for general expansion.

The Board of Education, Tarrytown, N. Y., contemplates the installation of manual training equipment in the proposed three-story addition to its high school at North Tarrytown, estimated to cost $160,000. Knappe & Morris, 171 Madison Avenue, New York, are architects.

The New York State Bridge & Tunnel Commission and the New Jersey Interstate Bridge & Tunnel Commission, Woolworth Building, New York, are asking bids until July 20 for switchboards for control of oil switches and motors, oil switches, distributing transformers and accessory power equipment. George R. Dyer and Theodore Boettger are chairmen of the commissions in order noted.

The Willard Storage Battery Co., 4 La Salle Street, New York, with headquarters at Cleveland, has leased a multi-story building, 50 x 100 ft., at 620-22 West Twenty-eighth Street, totaling 40,000 sq. ft. of floor space, for its main local factory branch and distributing plant. Equipment will soon be installed.

Elevating and conveying equipment, loading and other handling machinery will be installed in the proposed warehouse and distributing plant to be erected by the Manhattan Coffee & Sugar Co., Hulst Avenue, Long Island City.

J. M. Felson, 250 West Fifty-seventh Street, New York, architect, is completing plans for a two-story automobile service, repair and garage building, 100 x 100 ft. at Timpson Place and 149th Street, Bronx, to cost $100,000 including equipment.

The Erie Railroad Co., 50 Church Street, New York, has made application to the City Commissioners, Hoboken, N. J., for the vacation of four street terminals to provide a site

for the construction of new car and locomotive shops, for which plans will be drawn soon.

The Texas Co., 17 Battery Place, New York, has begun the construction of its proposed new oil refinery at Craig, Colo., to be equipped with a gasoline production department with an initial charging capacity of 1000 bbl. per day. The complete plant is reported to cost in excess of $750,000.

Jardine, Hill & Murdock, 347 Madison Avenue, New York, architects, have plans for a new five-story automobile service, repair and garage building at 250 West Twenty-fifth Street, to cost more than $150,000 with equipment.

The Long Island Lighting Co., 50 Church Street, New York, operating in the Rockaway district and other parts of Long Island, affiliated with the Queensborough Gas & Electric Co., is arranging for a new bond issue of $1,500,000, a portion of the proceeds to be used for extensions and improvements.

The Board of Education, Phillipsburg, N. J., plans the installation of manual training equipment in its proposed two-story high school on Morris Street, estimated to cost $400,000, for which bids will be asked on a general contract about the middle of July. Ernest Sibley, Bluff Road, Palisade, N. J., is architect.

The American Safety Signal Corporation, 897 Frelinghuysen Avenue, Newark, has been incorporated with capital stock of 40,000 shares common stock, no par value, for the purpose of manufacturing traffic signals, warning lights and other control devices to insure safety on streets and highways. The company will do its own manufacturing and has already bought some machinery and equipment. Eugene S. Mayer is president; Harry A. Moore, vice-president; Thomas Gamon, Jr., treasurer; and S. B. Dressler, secretary.

The Riverside Wire & Iron Works, 424 East Twenty-third Street, New York, has been incorporated to manufacture light iron and wire specialties. The plant has been operated by partnership since 1922. The company is in the market for a wire crimping machine and is also interested in receiving catalogs of other types of machines useful in its line of manufacture.

The Modern Home Utilities Co., 94 Branford Place, Newark, N. J., has been incorporated with capital stock of $100,000 and will act as distributer of oil burning equipment. It is in the market for electrical equipment, pipes, fittings and oil storage tanks. Hubert T. Richardson is president and treasurer; George C. Cowan, secretary; and J. J. Simmons, vice-president.

The Manhattan Refrigerating Co., West and Gansevoort Streets, New York, is disposing of a bond issue of $2,000,000, a portion of the proceeds to be used for the purchase of additional properties now under option and for the construction of additional cold storage and refrigerating facilities. T. A. Adams is president.

Motors and other power equipment, conveying, hoisting and kindred machinery will be installed in the five-story and basement printing plant to be constructed by the Argus Printing Co., Argus Building, Albany, N. Y., estimated to cost $175,000. Walter E. Timmis, 315 Fifth Avenue, New York, is architect.

Buffalo

BUFFALO, July 3.

A SITE, 105 x 650 ft., at Turner and Holmes Avenue, Indianapolis, has been acquired by the Morrison & Risman Co., 1437 Bailey Avenue, Buffalo, iron and steel products and scrap, as a site for a new branch plant for the reconstruction and reconditioning of railroad track materials, including frogs, switches, etc. The initial plant building will be 50 x 150 ft., to be supplemented with additional structures later. A list of machinery to be installed is being arranged. S. Morrison is president, and M. B. Morrison, secretary. F. C. Cullen will be manager at the new branch.

The Department of Parks and Public Buildings, James P. Moore, commissioner, City and County Hall, Buffalo, is considering the erection of a new municipal automobile service, repair and garage building, to cost in excess of $85,000 with equipment. Howard Beck, Municipal Building, is city architect.

The Barden & Robson Corporation, Penn Yan, N. Y., manufacturer of wooden baskets, crates, etc., has awarded a general contract to B. H. Rogers, Penn Yan, for a proposed one-story plant at Lockport, N. Y., 85 x 150 ft., to cost $100,000 with machinery. Plumer & Mann, 700 Main Street, Buffalo, are architects.

The American-La France Fire Engine Co., Inc., Elmira, N. Y., is disposing of a note issue of $4,000,000, a portion of the proceeds to be used for general expansion. The company has recently been constructing an addition to its branch plant at Bloomfield, N. J., for the manufacture of chassis for motor trucks. J. R. Clarke is president.

The Art Metal Construction Co., Jamestown, N. Y., manufacturer of metal filing equipment, etc., will begin the early erection of a four-story addition, 118 x 162 ft., to cost in excess of $150,000 with equipment.

The Board of Education, Oneida, N. Y., contemplates the installation of manual training equipment in its proposed two-story high school addition to cost $335,000, for which bids will be asked on a general contract this month. Wilson Potter, 22 East Seventeenth Street New York, is architect.

Philadelphia

PHILADELPHIA, July 3.

CONTRACT has been let by Samuel Yellin, 5520 Arch Street, Philadelphia, operating a general metal works, to the Haverstick-Borthwick Co., 1505 Race Street, for a two-story and basement addition, 51 x 100 ft., to cost $30,000.

The Edward G. Budd Mfg. Co., Twenty-fifth Street and Hunting Park Avenue, Philadelphia, manufacturer of steel automobile bodies, has awarded a general building contract to the Wark Co., 1600 Walnut Street, for a new multi-story plant on Stokley Street, estimated to cost $600,000 with machinery.

The Bisbee Linseed Co., Drexel Building, Philadelphia, has taken title to a building at Delaware Avenue and Bigler Street, with adjoining of four acres, and will use in connection with the proposed rebuilding of its works to replace a fire loss several months ago. The new structure will be five stories, 100 x 150 ft., estimated to cost $150,000. Edgar C. Bisbee is president.

The Willard Chevrolet Agency, 4131 Frankford Avenue, Philadelphia, has preliminary plans for a two-story addition to its service and repair division, 40 x 50 ft.; improvements will also be made in the present structure. The work is reported to cost about $50,000. Edward Schoeppe, 1437 Spruce Street, is architect. L. C. Krisher is president.

The Samuel F. Stanley Coal Co., 136 Washington Avenue, Philadelphia, has plans under way for a three-story automobile service, repair and garage building 65 x 117 ft., for company motor trucks and cars, to cost $150,000 including equipment. I. W. Levin, 1011 Chestnut Street, is architect.

Bids will soon be asked on a general contract by I. Fischman & Sons, 312 South Fourth Street, Philadelphia, manufacturer of soda water equipment, etc., for its proposed three-story and basement addition, 24 x 100 ft., estimated to cost $50,000 with equipment. Jacob Naschold, 5234 North Second Street, is architect.

The Crane Co., 836 South Michigan Avenue, Chicago, has awarded a general contract to M. B. Markland, 3540 Atlantic Avenue, Atlantic City, N. J., for its proposed one and two-story factory branch and distributing plant, 125 x 135 ft., at Atlantic City, to cost about $85,000. W. J. Clarke is company architect; Howard W. Stout, Guarantee Trust Building, Atlantic City, is associate architect.

In connection with a general expansion and improvement plan, the Ocean City Water Service Co., Ocean City, N. J., is said to be planning the installation of pumping machinery and auxiliary equipment. Permission has been granted for a bond issue of $800,000 and stock issue for $405,000, a portion of the proceeds to be used for the extensions.

The Public Service Electric & Gas Co., Public Service Terminal, Newark, N. J., has authorized the construction of an addition to its artificial gas plant at Camden, N. J., operated under the name of the Camden Gas Works. It will be 32 x 67 ft., with installation to include waste heat boilers, centrifugal blowers, steam accumulators and auxiliary apparatus.

In connection with extensions in its power plant at Pine Grove, Pa., now under way, the Eastern Pennsylvania Light, Heat & Power Co., Second and Market Streets, Pottsville, Pa., plans the installation of additional boilers and auxiliary equipment, as well as a coal-pulverizing plant and accessory apparatus.

The Dixie Drinking Cup Co., Easton, Pa., manufacturer of Paper products, has preliminary plans for an L-shape extension, 100 x 200 ft., on the William Penn Highway, providing in all about 50,000 sq. ft. of additional floor space. Considerable new machinery will be installed.

The Reading Automobile Co., 126 North Fifth Street, Reading, Pa., has preliminary plans for a new one and two-story machine repair and service building, 60 x 190 ft., to cost close to $50,000 including equipment. Harry Maurer,

The Crane Market

SELLERS of locomotive cranes report a large volume of inquiry in this district, but new business in overhead equipment is for the most part confined to hand power and small capacity electric cranes. Goodman Brothers, Cedar Grove and Mt. Hebron Cemetery, Flushing, N. Y., are in the market for a used 5-ton, 37-ft. 10¾-in. span, one, two or three-motor, floor controlled overhead crane. The Department of Public Works, New York, has issued a call for bids on furnishing a 2-ton electric monorail hoist, equipped with a bucket for a grit house and pump station on Chambers Street. Lists of cranes for the New York Rapid Transit Corporation, Stone & Webster and the General Electric Co. are still open. The Pennsylvania Railroad is reported about to close on two more locomotive cranes, in addition to the recent purchase of five divided between McMyler-Interstate Co. and the Ohio Locomotive Crane Co.

Among recent purchases are:

American Smelting & Refining Co., 120 Broadway, New York, a 10-ton electric overhead crane from an unnamed builder.

Anglo-Chilean Consolidated Nitrate Corporation, 120 Broadway, New York, four electric traveling cranes from an unnamed builder.

Chicago, North Western Railway, an electric gantry, center pit crane for Crawford Avenue shops, Chicago, from the Milwaukee Electric Crane & Mfg. Corporation, and a 10-ton electric traveling crane for Boone, Ill. from a Northwestern builder.

Illinois Central Railroad, two 22-ton, 8-wheel locomotive cranes for Gulf Port, Miss., from the Orton Crane & Shovel Co.

City of Detroit, Mich., a 25-ton, 8-wheel locomotive crane from the Orton Crane & Shovel Co.

234 North Fifth Street, is architect. H. O. Koller heads the company.

The Keystone Portland Cement Co., Bath, Pa., care of E. J. Fox, Easton Trust Co. Building, Easton, Pa., recently organized, has acquired property near Bath as site for a proposed cement mill, for which plans will soon be drawn. The initial plant is reported to cost in excess of $350,000 with machinery. Fred B. Franks, formerly superintendent at the mill of the Bath Portland Cement Co., Bath, heads the new company.

The Kingston School District, Kingston, Pa., H. A. Gordon, president, has engaged Mack & Sahm, Coal Exchange Building, Wilkes-Barre, Pa., architects, to prepare plans for a proposed senior high school, with manual training department, to cost $650,000.

The Climax Engineering Co., Clinton, Iowa, has appointed the Maerky Machine Works, 240 Cherry Street, Philadelphia, agent in that territory for replacement parts and service for its line of engines.

Cleveland

CLEVELAND, July 3.

THE machinery market was more active the past week. The Chevrolet Motor Co. continues to place orders for its Toledo plant and during the week purchased six multiple spindle drilling machines of a special type, a broaching machine and other miscellaneous tools, and is understood to have closed for a number of grinding machines for which it recently inquired. The Timken Roller Bearing Co., Canton, Ohio, is inquiring for machinery for its plant extension and is now figuring on considerable grinding machine equipment. A local manufacturer of turret lathes reports a good volume of scattered orders for one or two machines and states that its June sales showed a 20 per cent increase over May. The Nickel Plate railroad purchased a heavy duty power riveter from the McMyler Interstate Co., Cleveland. The American Steel & Wire Co. is inquiring for a 3-in bolt cutter and a 28-in. shaper, both motor driven.

The Chevrolet Ohio Motor Co., Toledo, Ohio, has placed a general contract with the Gettins-Kopitke Co., Toledo, for a plant extension, 134 x 250 ft. Mills, Rhines, Bellman & Nordhoff, Ohio Building, are the architects.

The Yellow Cab Co., Toledo, Ohio, is having plans prepared for a five-story garage at an estimated cost of $500,000. C. F. Wall is president.

Brennan & McBride, 6715 Carnegie Avenue, Cleveland, has placed contract with the Super Built Construction Co. for a two-story automobile repair shop, 45 x 53 ft.

The S. C. Williams Co., East Liverpool, Ohio, will erect a cooperage shop, 60 x 192 ft.

The Westinghouse Electric Products Co., Mansfield, Ohio, has placed a general contract with the Jacob Wolf Construction Co. for its plant extension, 80 x 390 ft.

The Maumee Malleable Castings Co., Toledo, Ohio, has placed contract for a one-story addition, 60 x 65 ft.

The Car Van Steel Products Co., 1212 Fifth Street, S. W., Canton, Ohio, will erect a one-story building, 60 x 100 ft.

The A. I. Root Co., Medina, Ohio, will take bids shortly for a factory building to replace one recently burned.

The American MonoRail Co., Cleveland, has been organized with a capital stock of $60,000 to manufacture monorail tracks, trolleys, hand power cranes, hoists and other material handling equipment and has established a plant at West Sixty-seventh Street and Pear Avenue. H. M. Miller recently resigned as sales director of the Louden Machinery Co., Fairfield, Iowa, to become president of the new company, and has had over 20 years' experience in this field, covering field engineering, manufacturing, advertising, sales and sales management. P. A. Geier, president P. A. Geier Co., Cleveland, is vice-president; Ralph W. Edwards, secretary and treasurer; Frank C. Harris, chief engineer, and J. P. Lawrence and L. E. Gaston, sales engineers.

Cincinnati

CINCINNATI, July 3.

THE machine tool market was quiet the past week and little fresh business was booked. There also was a noticeable absence of important inquiries. However, local builders anticipated a temporary lull in buying with the approach of the vacation season. The purchase of eight lathes by an automobile maker in the Detroit district was the largest sale locally. The Illinois Central continued to be an active buyer, and closed for a number of lathes and other tools for its Paducah shops. Included in the equipment contracted for by this carrier are a 90-in. locomotive journal turning lathe, a 36-in. x 18-ft. lathe, a 90-in. quartering machine and a 10-ft. pneumatic flanging clamp.

The Clinchfield Railroad, Johnson City, Tenn., bought a No. 5 carwheel lathe, and the Lehigh & Hudson River Railroad, Warwick, N. Y., took an 8-ft. hand flanging clamp. A New England machine tool manufacturer purchased a 36 44 sidehead boring mill. A Chicago company bought an automatic screw machine for delivery to San Francisco, while a Los Angeles concern is the buyer of a 200-lb. compact hammer. An automobile manufacturer contracted for two large lathes with a local builder.

The Southern Railway, Washington, will take bids through L. H. Skinner, purchasing agent, until July 12 on the following tools, all motor driven, with Westinghouse or General Electric 440-volt, 3-phase, 60-cycle motors:

One 90-in. driving wheel lathe with double inside journal turning attachment and single quartering attachment.
One 24-in. geared head engine lathe, 6-ft. between centers.
Two 18-in. geared head engine lathes, 6-ft. between centers.
One 18-in. monitor brass lathe.
Two 14-in. x 16-in. portable bolt lathes.
One 3-in. universal bar turret lathe.
One 3½-in. flat turret lathe with bar attachments.
One 51-in. heavy duty boring mill with driving box chuck.
One 24-in. vertical boring mill with one swivel turret head, power traverse and plain table.

One 42-in. x 42-in. x 18-ft. heavy duty reversing motor drive planer.
One 32-in. heavy duty crank shaper.
One gap piston rod grinder to take pistons 30-in. in diameter and rods 5-ft. long.
Two 2½-in. double head bolt cutters.
One No. 3 universal milling machine.
One 6-ft. heavy duty plain radial drill.
One 28-in. back geared drill press.
One 48-in. single end punching and shearing machine with capacity of 1½-in. hole in 1-in. plate.
One flue roller for use with electric flue welder.
One rotary flue cleaner.
Three double floor grinders for 3-in. x 16-in. wheels, with wheel guards but without wheels.

Bids are asked on the following machines without motor drive attachment:

One sensitive drill.
One electric flue welder with dies for 2-in. and 2¼-in. flues.
One 2000-lb. steam hammer.

The Arrow Sand & Gravel Co., Columbus, Ohio, will erect a gravel plant on West Mound Street, at an estimated cost of $200,000. W. H. Hogland is president.

Plans are being completed by the Appalachian Hardwood Lumber Co., Pearl and Brookpark Streets, Dayton, Ohio, for the rebuilding of the portion of its mill recently destroyed by fire, with loss estimated at $40,000 including equipment. G. A. Hummel is president.

The Bexley Village Board of Education, Bexley, Ohio, will install manual training equipment in its proposed new junior high school on Cassingham Road, estimated to cost $300,000, for which bids are being asked on a general contract. Miller & Reeves, 50 South Third Street, Columbus, Ohio, are architects.

In addition to its proposed local automobile service, repair and garage building to cost about $100,000, the Department of Highways and Public Works, Columbus, Ohio, G. F. Schlessinger, director, is projecting plans for two additional such structures, one at New Philadelphia, 80 x 120 ft., to cost close to $55,000 with equipment, and the other of similar size and cost, at Sidney. The Ohio Highway Engineers, Ohio-Hartman, Building, Columbus, are engineers, H. B. Briggs, in charge.

The Huenefeld Co., Spring Grove and Straight Streets, Cincinnati, has preliminary plans for a five-story automobile service, repair and garage building to cost about $250,000 with equipment. Garber & Woodward, 4 West Seventh Street, are architects.

The Dempster Equipment Co., Walnut Street, Knoxville, Tenn., machinery dealer, has inquiries out for a road roller, from 3 to 5 tons in weight.

The City Council, Lawrenceburg, Tenn., has tentative plans for extensions and improvements in the municipal electric power plant, to include the installation of a 200-hp. oil-burning engine and auxiliary equipment. E. P. Nixon is city engineer in charge.

The Common Council, Franklin, Ky., is considering the installation of pumping equipment in connection with proposed extensions and improvements in the municipal waterworks. A fund of $40,000 is being arranged for the project.

The Southern Cities Utilities Co., Chattanooga, Tenn., is arranging for a new bond issue of $5,500,000, a considerable portion of the fund to be used for extensions and improvements in power plants and system.

The Noel Estate, Noel Building, Nashville, Tenn., will soon begin work on a ten-story automobile service, repair and garage building, 100 x 175 ft., estimated to cost $225,000 with equipment.

The American Pulverizer Co., St. Louis, has appointed A. M. Lockett & Co., Queen & Crescent Building, New Orleans, agents for its line of products in Louisiana and southern Mississippi, and the Titzel Engineering & Equipment Co., 20 East Gen. Robinson Street, Pittsburgh, its representative in western Pennsylvania, West Virginia and western Virginia.

On July 7 the stockholders of Walden-Worcester, Inc., Worcester, Mass., automobile wrenches, etc., will vote on the question of a consolidation of that company with Stevens & Co., New York, distributers. If the plan is ratified the new company will be known as Stevens-Walden-Worcester Co. Each concern is reported to do a business of more than $1,000,000 a year. Louis Schwab is sole owner of Stevens & Co. J. Verner Critchley is president of the Worcester concern.

Chicago

CHICAGO, July 3.

JUNE sales of machine tools were as large, if not larger, than those for May, and total bookings of local dealers during the first half of this year were materially greater than during the same period of 1925. Railroad buying has been an important factor in the past six months and industrial buying, although of varying volume, has bulked large in the aggregate. The Illinois Central is still placing orders both for its Paducah, Ky., shops and other points on the line. Its purchases of machine tools thus far have totaled several hundred thousand dollars. The Union Pacific System has concluded buying, and its orders aggregated close to $200,000. The Chicago & North Western and the Rock Island Lines have been placing small orders from time to time. The latter road has issued inquiries for two 18-in. x 36-in. motor-driven gap lathes. Moderate lists issued by the Great Northern and the Northern Pacific are still pending. Thus far the Burlington has bought only a few machines against the list which it put out a week ago.

The International Harvester Co. continues to place orders for its tractor plant at Rock Island, buying both new and used tools. The Goodman Mfg. Co., Chicago, recently closed for about $25,000 worth of machine tools. The Gradner Governor Co., Quincy, Ill., has also been a recent buyer. As a rule, however, industrial companies are placing orders for one or two machines at a time. Machine tool prices are holding and in some cases are stronger. A line of ball bearing drills has been advanced about 10 per cent.

The Cuneo Press, near Twenty-second and Jefferson Streets, Chicago, contemplates installing two boilers in a building, construction of which has just been started.

The Sterling Iron & Bridge Co., Joliet, Ill., has purchased a lot on Rowell Avenue, near Fourth Avenue, for the construction of a small assembly plant and storage yard.

Fire recently damaged the warehouse of the Davenport Iron & Machinery Co., Davenport, Iowa.

The International Steel & Iron Co., 3936 South Lincoln Street, Chicago, has purchased the corner of Kedzie Avenue and Fifty-first Street, comprising 64,000 sq. ft., and plans to erect a one-story warehouse, which will cover practically the entire lot. The building will be used for storing sheet steel.

The Argo Iron & Metal Co., 1662 Elston Avenue, Chicago, has awarded a general contract for a two-story and basement addition, to cost $100,000.

The Elgin National Watch Co., Elgin, Ill., plans to erect a four-story and basement factory addition, 130 x 500 ft., to cost $750,000.

The General Metal Spinning Co., 12834 North California Avenue, Chicago, will build a one-story factory, 40 x 100 ft., at 2643 Belmont Avenue, to cost $90,000. B. J. Rappaport, 6709 Lakewood Avenue, is architect.

Maier & Co., packers, 2863 Lincoln Avenue, Chicago, plan to construct a one and one-half-story boiler house, 56 x 86 ft., to cost $20,000. Richard J. Griesser, 64 West Randolph Street, is the architect.

Charles A. Brewer & Sons, manufacturers of advertising specialties, 6320 Harvard Avenue, Chicago, will take bids July 6 through Alfred S. Alschuler, 28 East Jackson Boulevard, Chicago, on a four-story factory addition, 57 x 100 ft., to cost $100,000.

The William Glader Co., 210 North Ann Street, Chicago, has placed a contract for a two-story machine shop, 50 x 102 ft., to cost $15,000.

The Alonzi Furniture Co., 1840 West Austin Avenue, Chicago, will build a two-story factory addition, 100 x 104 ft., to cost $55,000.

Scholz & Stalder, machinists, 2062 Elston Avenue, Chicago, have awarded contracts for a one-story factory, 70 x 83 ft., to cost $6,000.

The American Car & Foundry Co., Railway Exchange Building, Chicago, will erect a crane runway, 100 x 313 ft., at 2605-17 South Wood Street, Chicago, to cost $25,000.

Plans have been filed by the American Car & Foundry Co., 2417 South Paulina Street, Chicago, for a one-story addition, 100 x 315 ft., to cost $25,000.

The Clapp, Riley & Hall Equipment Co., 12 North Clinton Street, Chicago, has plans for a five-story and basement automobile service, repair and garage building, 80 x 150 ft., estimated to cost $400,000. Herman Simpson is company architect.

The Economy Pump & Machinery Co., 1122 Curtis Street, Chicago, is said to have tentative plans under way for a one and two-story addition, to cost in excess of $60,000 with equipment. R. H. Thomas is president and treasurer.

The Public Service Co. of Colorado, Denver, is disposing of a bond issue of $6,000,000, a portion of the proceeds to be used for extensions in plants and system. Henry L. Doherty, 60 Wall Street, New York, is president.

The City Council, Ovid, Colo., is asking bids until July 12 for equipment for a municipal waterworks and system, including pumping machinery and 100,000-gal. capacity elevated steel tank. John E. Field, Kittredge Building, Denver, Colo., is consulting engineer.

The Board of Education, Alton, Ill., plans the installation of manual training equipment in its proposed three-story and basement high school, to cost $300,000, for which superstructure work will soon begin. Royer, Danely & Smith, Flat Iron Building, Urbana, Ill., are architects.

The Interstate Power Co., 327 South La Salle Street, Chicago, operating electric light and power properties in several States, is disposing of a preferred stock issue of $1,425,000, a portion of the proceeds to be used for expansion, including extensions in power plants and system. The company is arranging to take over the Tri-State Utilities Co., Eldora, Iowa, and the Minnesota Electric Distributing Co., Minneapolis. H. L. Clarke is president.

The Chicago Rapid Transit Co., 72 West Adams Street, Chicago, has tentative plans for a one-story car repair shop at Niles Center, Ill., 200 x 220 ft., to cost about $300,000 with equipment. A. Gerber, 72 West Adams Street, is architect.

The Cleary Box Co., 3315 Forty-eighth Place, Chicago, manufacturer of corrugated boxes and containers, has awarded a general contract to Heidel & Beck, 6235 South Michigan Avenue, for a one-story and basement addition, 50 x 135 ft., to cost $45,000 with equipment. A. Epstein, 2001 West Pershing Road, is architect and engineer.

The Chicago Pneumatic Tool Co., 572 West Randolph Street, Chicago, will erect a two-story addition, 50 x 168 ft., to cost about $50,000 with equipment.

The Meany Casket Co., 311 Falls Avenue, Waterloo, Iowa, has plans for a one-story and basement addition, 40 x 60 ft., for which foundations will be laid at once. J. J Meany is head.

Indiana

INDIANAPOLIS, July 3.

A PREFERRED stock issue of $2,500,000 is being sold by the Northern Indiana Public Service Co., East Chicago, Ind., a portion of the proceeds to be used for extensions and improvements in plants and systems.

The Hoosier Kitchen Cabinet Co., Newcastle, Ind., has awarded a general contract to the Pan-American Bridge Co., Newcastle, for a three-story addition to cost $50,000 with equipment.

The Studebaker Corporation, South Bend, Ind., has awarded a general contract without competition to the R. Sollitt & Son Co., 518 East Sample Street, for a two-story and basement automobile service, repair and garage building, 100 x 166 ft., to cost $150,000 with equipment. A. R. Erskine is president.

The Absolute Contracting Co., Elkhart, Ind., heating and electrical equipment, etc., has awarded a general contract to A. J. Longacre, Elkhart, for a new one-story plant, 110 x 400 ft., to cost $50,000. Hubert Miller, Monger Building, is architect.

The Economy Box & Pie Plate Co., Marion, Ind., manufacturer of paper boxes and other containers, has plans for a one-story addition to cost $40,000, of which more than $25,000 will be expended for equipment. W. H. Arthur, is general manager.

The National Oil Products Co., 1007 National City Bank Building, Indianapolis, is arranging for the establishment of a new storage and distributing plant on State Avenue. The company was organized recently with J. G. Tucker, president and treasurer; Scott Wichet, vice-president and general manager, and Ellis E. Sluss, secretary.

The National Dry Kiln Co., 1118 East Maryland Street, Indianapolis, manufacturer of lumber kilns, has leased a portion of the building at Georgia and West Streets, totaling about 25,000 sq. ft. of floor space, for a new plant to be ready for occupancy early in the fall. It is purposed to remove the present works to this location.

The Kokomo Automotive Mfg. Co., Kokomo, Ind., is in the market for a single-cylinder boiler-feed pump to supply water to a 40-hp. boiler against a pressure of 40 lb. steam.

St. Louis

ST. LOUIS, July 3.

CONTRACT has been let by the United States Register Co., 330 West Fifth Street, Kansas City, Mo., to the Duncan-Lynch Construction Co., Interstate Building, for its proposed three-story and basement storage and distributing plant, 80 x 100 ft., to cost $60,000. R. H. Sanneman, Lee Building, is architect.

Fire, June 25, destroyed a portion of the tank plant of the Magnolia Petroleum Co., El Dorado, Ark., with loss reported at $200,000 including equipment. It is planned to rebuild. Headquarters are at Dallas, Tex.

The Campbell-Heinz Co., Fidelity Bank Building, Memphis, Tenn., R. J. Campbell, president, has tentative plans for a new zinc concentrating plant at Walnut Ridge, Ark., to cost in excess of $75,000 with equipment.

The Moloney Electric Co., Seventh and Hickory Streets, St. Louis, manufacturer of transformers and kindred electric equipment, is said to be arranging for an architect to prepare plans for its new plant on Bircher Street, to cost more than $600,000 with equipment. The company is a subsidiary of the American Brown-Boveri Electric Co., New York. T. O. Moloney is president.

The St. Louis Machinists' Supply Co., 920 North Broadway, St. Louis, machinists' tools and equipment, has taken over the one-story building at 1032 North Sixth Street for expansion.

The Commerce Mining & Royalty Co., Cardin, Okla., has preliminary plans for rebuilding the portion of its Gray Goose mining plant, recently destroyed by fire. The new structure is estimated to cost in excess of $100,000 including equipment.

The W. G. Barron Post Co., Fayetteville, Ark., manufacturer of wood posts, etc., has completed arrangements for the removal of its business from Coombs, Ark., to Fayetteville, where the capacity will be considerably increased.

J. P. Cantrell, 1875 North Grant Street, Springfield, Mo., has preliminary plans under way for a two-story and basement automobile service, repair and garage building, 60 x 120 ft., to cost $55,000 with equipment.

The Board of Education, Luther, Okla., has plans for a one-story manual training building at the local high school and will begin work soon.

The Fisher Body Co., General Motors Building, Detroit, is reported to have acquired hardwood property on the White River, Monroe County, Ark., and contemplates the construction of a lumber plant in this section.

J. Latenser & Sons, Peters Trust Building, Omaha, Neb., architects, have completed plans for a three-story and basement automobile service and repair building, 140 x 172 ft., to cost about $250,000 with equipment.

Detroit

DETROIT, July 3.

BIDS will soon be asked by the Richard Brothers Die Works, 1560 East Milwaukee Avenue, Detroit, for a one-story plant at Hillsdale, Mich., 90 x 342 ft., estimated to cost $75,000 with equipment. J. Lawson Miller, Goebel Building, is architect. Clement C. Richard is one of the heads of the company.

The Board of Education, Holly, Mich., is considering the installation of manual training equipment in its proposed two-story senior high school, estimated to cost $115,000, for which bids will be asked during July on a general contract. Malcomson & Higginbotham, 1219 Griswold Street, Detroit, are architects.

The United States Gypsum Co., 205 West Monroe Street, Chicago, will proceed with the erection of a new plant on the River Rouge, near Dearborn, Mich., where a site of 7 acres has been secured. The works are reported to cost in excess of $200,000, including machinery.

The Wolverine Tube Co., 1411 Central Avenue, Detroit, manufacturer of metallic tubing, etc., has awarded a general building contract to E. L. Jones, Inc., 1901 Washington Boulevard, for its two-story addition, 120 x 120 ft., for general increase in production, and a second two-story addition for storage warehouse and distributing service. The entire project will cost in excess of $150,000 with equipment.

The American Blower Co., 6004 Russell Street, Detroit, manufacturer of fans, blowers and other draft equipment, has asked bids on a general contract for a one-story addition,

140 x 162 ft., to cost about $100,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects.

In connection with the erection of the new Canbrook school for boys, Bloomfield Hills, near Detroit, estimated to cost $1,250,000, departments will be installed for vocational training, including machine and repair shop, electrical shop and wood-working shop. Work on the main group will soon begin. The Board of Trustees is in charge.

The West Michigan Steel Foundry Co., Muskegon, Mich., is negotiating with R. J. McGeevy, receiver for the Armstrong Steel Casting Co., Huntington, Ind., for the purchase of the plant and proposes to establish a branch works in the building for the production of steel casting boxes and kindred apparatus. It is understood that the present plant will be maintained at Muskegon.

The Gemmer Mfg. Co., 2435 Merrick Avenue, Detroit, manufacturer of automobile gears, hardware, etc., has acquired the local plant of the Parish Mfg. Co., manufacturer of automobile axles and kindred products, and will use in the future for its main plant.

The Owen-Graham Co., Detroit, has acquired the plant of the Stimson Scale & Electric Co., Northville, Mich., and will convert the factory for the manufacture of bodies for airplanes.

The Board of Education, East Lansing, Mich., plans the installation of manual training equipment in its proposed new two-story and basement high school, estimated to cost $220,000, for which superstructure will soon be placed under way. J. N. Churchill, Prudden Building, Lansing, is architect.

The Pere Marquette River Co., Grand Rapids, Mich., recently organized, represented by Charles Owen, Grand Rapids, attorney, has applied for permission to use waters from the Pere Marquette River for a proposed hydroelectric power development, reported to cost in excess of $500,000.

The Acme Steel Products Co., General Motors Building, Detroit, has recently been incorporated and is acting for various companies as district sales representative in the Detroit territory. It is specializing in forgings, castings, bolts and bronze for the automotive and railroad trade and among the companies it represents are the Pittsburgh Knife & Forge Co., South Bend Foundry Co., Railway Products Co., Keystone Bronze Co., Neely Nut & Bolt Co. and the Northwestern Motor Co. Joseph G. Gardner is president.

Gulf States

BIRMINGHAM, July 3.

BIDS are being asked by the Board of City Commissioners, Fort Lauderdale, Fla., until Aug. 5, for a low-service pumping plant with capacity of 3,000,000 gal. per day for the waterworks, also for a 4,000,000 gal. capacity water-softening and purification plant, including filters, chemical house, etc. Solomon, Norcross & Kreis, Fort Lauderdale, are consulting engineers. B. J. Horne is city manager.

The Val Verde Mercantile Corporation, H. P. Hansen, president, Donna, Tex., contemplates the construction of an ice and refrigerating plant in connection with a proposed local canning factory. The entire project will cost close to $400,000 with machinery.

Stouch & Whitaker, Winter Haven, Fla., have plans for the early construction of new works for the manufacture of concrete tile products, with initial output of about 6000 pieces per day.

The Pan-American Petroleum Co., New Orleans, is said to have arranged a fund of about $1,000,000 for the construction of new storage and distributing plants in this section. Work on initial structures will soon begin.

The Kinzbach Tool Co., Inc., Sawyer Street, Houston, Tex., has taken over a portion of the local storage and distributing plant of the Harrisburg Pipe & Pipe Bending Co., for the establishment of a tool works. Equipment is now being purchased.

The Birmingham Electric Co., Empire Building, Birmingham, operating the local light and power system, has plans under way for a new equipment storage and warehouse building, two-stories, 120 x 150 ft., with the installation of machine and repair shops and other departments. The entire project will cost in excess of $200,000. J. S. Pevear is vice-president and general manager.

The Jacobs Mfg. Co., Bridgeport, Ala., operating a foundry, has been making inquiries for tumbling barrels. E. R. Jacobs is head.

The City Council, York, Ala., is asking bids until July 15 for equipment for a municipal waterworks, including a centrifugal pump with capacity of 750 gal. per min.; one 60,000 to 75,000-gal. capacity elevated steel tank; 150,000-gal. filter plant and auxiliary equipment. Robert L. Totten, Inc., Birmingham, is consulting engineer.

The Hughes Tool Co., 300 Hughes Street, Houston, Tex., manufacturer of oil-well tools and equipment, will proceed with the construction of a one-story addition, 40 x 240 ft., for which a general contract recently was let to the Houston Structural Steel Co., Center Street. Additional equipment will be installed. Howard Hughes, Jr., is president.

R. E. E. de Montluzin Co., Inc., 306 Baronne Street, New Orleans, has inquiries out for a Diesel engine for use with a hydraulic dredge; also for a quantity of pumping equipment for like service, as well as drainage pumps.

The Shreveport Ice & Brewing Co., Western and Culpepper Streets, Shreveport, La., will proceed with the early construction of a new ice-manufacturing plant, estimated to cost $65,000.

The Pecos Valley Southern Railway Co., Pecos, Tex., has plans for a one-story car repair shop, 60 x 100 ft., to cost about $45,000 with equipment. J. Roy Smith, Blackburn Building, Amarillo, Tex., is architect.

The Common Council, Celeste, Tex., plans the installation of pumping equipment in connection with a proposed municipal waterworks and sewage system, for which a fund of $50,000 is available. Koch & Fowler, Central Bank Building, Dallas, Tex., are consulting engineers.

Pacific Coast

SAN FRANCISCO, June 30

CONTRACT has been let by the Crane Co., Los Angeles, to H. A. Nichols, Bank of Italy Building, for a one-story pipe shop. Morgan, Walls & Clements, Van Nuys Building, are architects. Headquarters are at 836 South Michigan Avenue, Chicago.

The new foundry to be built by the Oakland Steel Co., Oakland, Cal., E. W. Olin, president, will be erected on a one-acre tract at Fourth and Chapman Streets, recently acquired. Other buildings will be constructed later. The company was lately organized by Mr. Olin, secretary of the East Bay Industrial Association and associates.

T. M. Gibson, 2510 North Beachwood Drive, Los Angeles, has filed plans for a one-story machine shop, 30 x 62 ft.

The Schilling-Evertz Co., 1824 Ellis Street, Bellingham, Wash., operating a general iron works, plans the construction of a one-story addition.

The Portland Electric Power Co., Portland, has plans for a one-story addition to its power house at Salem, Ore., to cost $35,000.

The Grays Harbor Railway & Light Co., Aberdeen, Wash., plans to begin work in 30 to 60 days on its proposed hydroelectric power development on the Cowlitz River, near Mayfield, Wash., estimated to cost $250,000. W. W. Briggs is vice-president and general manager.

The Board of Education, School District No. 1, Phoenix, Ariz., has plans for a one-story manual training building at its school group on the Adams School Grounds, to cost about $35,000 with equipment. Fitzhugh & Byron, Home Builders' Building, are architects.

The Sullivan Mining Co., Kellogg, Idaho, has authorized plans for an electrically-operated zinc smelting plant, to cost close to $1,000,000 with machinery. The expansion will be carried out over a period of months.

The Holtville Ice & Cold Storage Co., Holtville, Cal., has plans for additions to its plant, with installation to comprise equipment for developing 70 tons additional capacity per day F. A. Willard is president.

The Washington Dehydrated Food Co., Yakima, Wash., has preliminary plans for a new dehydrating plant to replace property recently destroyed by fire. It is estimated to cost about $80,000 with equipment. Dr. Ira Cardiff is president.

The Board of Education, Ogden, Utah, has plans for new manual training shops at the local high school, reported to cost in excess of $60,000 with machinery and equipment. M. Charles Woods, Eccles Building, is architect.

The San Diego Consolidated Gas & Electric Co., San Diego, Cal., will construct a new power substation in East San Diego, estimated to cost about $325,000 including equipment.

The Angelus Souvenir & Mfg. Co., 243 South Los Angeles Street, Los Angeles, manufacturer of metal and other specialties, has awarded a general contract to V. P. Gilbert, Citizens' National Bank Building, for a new two-story plant, 85 x 158 ft., at 663 69 East Merrill Avenue, to cost about $30,000 with equipment.

The Rhodes-Jamieson Co., near Broadway Wharf, Oakland, Cal., operating a building material business, will build an addition to cost about $25,000, to be used as a storage and distributing plant for reinforcing steel products, with handling equipment, etc.

Milwaukee

MILWAUKEE, July 6.

MACHINE-TOOL builders entered the second half of the year with greater encouragement as to prospects for new business than was expected three months ago. June business is reported to have topped the figures for both April and May to make a first half comparable to the corresponding period of a year ago. Makers of milling machines not only have a relatively good volume of business on their books, but have to look forward to large requirements, especially from the automotive industries, the General Motors Corporation projects being particularly encouraging. Sales of milling machines to railroads are improving and stand considerably above a year ago.

The Badger Meter Mfg. Co., Thirtieth and Meinecke Avenues, Milwaukee, expects to award contracts about July 10 for the erection of a two-story addition, 60 x 120 ft., designed by M. Tuligren & Sons, architects, 9 Waverly Place. It manufactures water meters principally. J. J. Leach is president and general manager.

Schaefer & Co., 990 Lincoln Avenue, Milwaukee, manufacturers of monuments, ornamental stone, etc., are building a new plant, 124 x 163 ft., part two stories and basement, to cost about $100,000. Motor-driven polishing machinery and other equipment will be required. The engineers are Klug & Smith, 69 Wisconsin Street, Milwaukee.

The Common Council, Brodhead, Wis., will close bids July 14 for the construction of a municipal sewage system and a sewage disposal plant, complete with pipe, tanks, pumps and other equipment. W. G. Kirchhoffer, Madison, Wis., is consulting engineer. J. W. Gardner is city clerk.

The Crescent Motor Co., Fond du Lac, Wis., contemplates the erection of a new automotive headquarters building to replace its garage, destroyed by fire June 22 with a loss of $130,000. The new investment will be about $75,000.

The Wausau, Wis., Board of Public Works, is asking bids until July 20 for the construction and equipment of a $125,000 filtration-aeration plant for the local waterworks system. The main building will be 93 x 143 ft., with an auxiliary house for engines, pumps, air compressors, etc., 37 x 143 ft., two stories. B. C. Gowen is city engineer, and J. M. Howarth, superintendent of waterworks.

Steps have been taken by the stockholders of the Oshkosh, Wis., Motor Truck Co., for an early resumption of production on a quantity scale. The company will issue new stock in exchange for the old, subject to a bond issue, thus gaining much needed working capital.

The Schumann & Roden Sheet Metal Works, Milwaukee, on July 1 completed the transfer of its entire operation into a new plant at 2515 Fond du Lac Avenue, in which it gains about 300 per cent more capacity.

South Atlantic States

BALTIMORE, July 3.

PRELIMINARY plans are being arranged by the duPont Motors, Inc., Wilmington, Del., for a one-story addition to provide about 5000 sq. ft. additional floor space, all of which will be used for increased production facilities. E. Paul duPont is president.

The Liggett & Myers Tobacco Co., Durham, N. C., is said to have plans under way for a new steam-operated electric generating plant to cost $185,000 with equipment. It will replace an existing station which will be dismantled. Lockwood, Greene & Co., 1 Pershing Square, New York, are architects and engineers. General offices of the company are at 4241 Folsom Avenue, St. Louis.

The Zell Motor Co., 11 East Mount Royal Avenue, Baltimore, will take bids at once on a general contract for a proposed two-story service, repair and garage building, 140 x 240 ft., to cost close to $90,000 with equipment. T. Wells Pietsch, American Building, is architect.

George Ledbetter, 390 Southside Avenue, Asheville, N. C., has inquiries out for a planer, small type; also for a band saw.

The Richmond Motor Terminals, Inc., Tenth and Broad Streets, Richmond, Va., R. T. Lipscombe, representative, has preliminary plans for a proposed eight-story service, repair and garage building, estimated to cost $700,000 with equipment.

The Central of Georgia Railway Co., Savannah, Ga., has awarded a general contract to the Artley Co., East Bay Street, for its proposed 18-stall engine house with repair facilities, adjoining a similar structure. Considerable equipment will be installed, including an electric drop table, Whiting type, to replace a present drop pit and air jack. The entire work is estimated to cost close to $100,000. C. E. Weaver is chief engineer.

The Farmers' Mfg. Co., Board of Trade Building, Norfolk, Va., W. S. Spencer, general manager, has begun the construction of a new stave mill at Maysville, N. C., reported to cost more than $50,000 with equipment.

The Board of District Commissioners, District Building, Washington, has awarded a general contract to Parson & Hyman, 1010 Vermont Avenue, N. W., for its proposed two-story and basement McKinley manual training school, 300 x 300 ft., at Second and T Streets, N. E., to cost $1,980,000 with equipment. Superstructure will soon begin. A. L. Harris, District Building, is municipal architect.

The Hackley Morrison Co., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a bed plate for a double drum Lambert hoist, 8¼ x 10 in., and two boilers, 72 in. x 18 ft., steel encased, Dutch oven type, with stacks.

The Southside Power Co., 240 West Susquehanna Avenue, Philadelphia, has applied for permission to construct a hydroelectric generating plant in the vicinity of Talley's Falls, Mecklenburg County, Va., to develop an initial capacity of about 20,000 hp.

Fire, June 28, destroyed a portion of the factory of the South Boston Wagon Co., South Boston, Va., with loss reported at $40,000, including finished stock. Plans for rebuilding are under advisement.

The Tom Huston Mfg. Co., Columbus, Ga., is in the market for one used 48-in. or 50-in. two-head vertical boring machine.

Pittsburgh

PITTSBURGH, July 3.

JUNE proved a fairly good month in machine tool sales in this district, and while it is possible that there may be some let down this month and next, it is not thought likely that the market will lose all of the momentum it has gained the first half of the year. The quarterly list of the Westinghouse Electric & Mfg. Co., which has between 60 and 70 items, is a little heavier than the one for the second quarter.

In connection with its proposed acquisition of a number of electric light and power utilities in Mercer, Beaver, Lawrence and other neighboring counties, the Pennsylvania Power Co., Ellwood City, Pa., has arranged for a bond issue of $3,800,000, a portion of the proceeds to be used for extensions and improvements, including transmission lines. C. S. MacCalla is president.

The Monessen Sand & Gravel Co., Monessen, Pa., has preliminary plans for a new local sand and gravel unloading plant, with complete equipment.

The Duquesne Light Co., 435 Sixth Avenue, Pittsburgh, has preliminary plans in progress for a new electric generating plant in the vicinity of Shippingport, Pa., on the Ohio River. The new station will be of nine-unit type and will cost more than $25,000,000 with transmission system. It is purposed to break ground within a year during which time details will be completed. James M. Graves is vice-president.

The Edgewood School District, Edgewood, Pa., contemplates the installation of manual training equipment in a proposed two-story and basement addition to the high school on Maple Street to cost about $115,000. Ingham & Boyd, Empire Building, Pittsburgh, are architects.

Fire, June 25, damaged a portion of the Eclipse Works of the Atlantic Refining Co., Franklin, Pa., with loss reported at close to $40,000, including tanks and other equipment. It is planned to rebuild. Headquarters are at 260 South Broad Street, Philadelphia.

The Southern Supply Co., Inc., Citizens National Bank Building, Charleston, W. Va., has inquiries out for a wagon-loader, Barber-Greene or similar type.

The Owens Bottle Co., Nicholas Building, Toledo, Ohio, is said to be arranging an immediate call for bids for proposed additions to its Charles Boldt plant at Huntington, W. Va., to include a new building, 400 x 600 ft., with several smaller structures, and installation of equipment. The entire project is reported to cost in excess of $500,000.

The Guyan Machine Shops, Inc., Logan, W. Va., machinery dealer, has been making inquiries for a punch and slitting shear, suitable for handling ½-in. plate stock; also

a grinder for milling cutter service, and a combination band and circular saw.

The Westinghouse Air Brake Co., Wilmerding, Pa., has awarded a general contract to the F. Hoffman Co., Wilkinsburg, Pa., for a four-story addition for administration and operating service, to cost in excess of $100,000. Janssen & Cocken, Pittsburgh, are architects.

New England

BOSTON, July 3.

MACHINE tool houses dealing exclusively in new equipment report no improvement in sales. Used tools, however, have been in fairly good demand but sales have been confined mostly to one or two firms who have made some low prices to reduce stocks. The largest individual sale reported consisted of five lathes, a radial drill, a motor-driven drill and three shapers to a Massachusetts shop. New inquiries are fewer and the local trade anticipates no real activity in the market much before September.

Demand for small tools has dropped to small proportions also. The lull in business is attributed to the general holiday from Friday night, July 2, until July 6, and to the summer slowing up in industry.

The Buff & Buff Mfg. Co., 98 Green Street, Jamaica Plain, Boston, surveying instruments, is having plans prepared for extensive plant alterations.

The Lever Brothers Co., Broadway, Cambridge, Mass., soaps, is taking bids on a proposed one-story, 70 x 150 ft. kettle building addition. Charles T. Main, 200 Devonshire Street, Boston, is the engineer.

Pierce & Chesworth, Inc., 32 Travers Street, Gardner, Mass., mill machinery, has under contemplation the erection of a two or three-story shop, 42 x 105 ft. Plans are private.

Chandler & Farquhar Co., 250 Devonshire Street, Boston, mill supplies, has been reorganized with Clyde Morgan, S. D. Warren Paper Co., 101 Milk Street, Boston, as president.

The Ideal Foundry Co., Providence, R. I., is arranging for the early occupancy of its new one-story foundry, 40 x 80 ft., for which superstructure is nearing completion.

The Malden Electric Co., 139 Pleasant Avenue, Malden, Mass., operating the local light and power system, has plans for a three-story equipment storage and repair building, 120 x 185 ft., with garage and service departments, to cost $140,000 with machinery. Charles H. Tenney & Co., 200 Devonshire Street, Boston, are architects and engineers. Executive offices of the company are at the last noted address.

Officials of the New Haven Sherardizing Co., 868 Windsor Street, Hartford, Conn., manufacturer of special machinery for the rubber industry, and the Metal Protection Corporation, Indianapolis, have organized the Chromilite Process Corporation, capitalized at $150,000, to operate plants for rust-proofing, metal-finishing and chrome-nickeling of steel under a special process, developed by James F. Patton of the Indianapolis company, who will be vice-president of the new concern. The initial plant will be at Akron, Ohio, where property has been secured, and is expected to be ready for service in August. A second works is contemplated for Hartford, where a site has been purchased adjoining the New Haven plant on Windsor Street, totalling about 3½ acres. A third plant is expected to be established closely following at Springfield, Mass. August F. Schoen is president of the new company, and Wesley I. Charter of the New Haven Sherardizing Co., treasurer.

The Nevins Needle Co., Franklin, N. H., manufacturer of latch needles for knitting machines and other textile equipment, has leased a factory at Hill, about six miles distant, and will remove its business to this location. It is planned to increase the capacity. M. J. Nevins heads the company.

The Dedham & Hyde Park Gas & Electric Co., Boston, has completed plans for a one-story automobile service, repair and garage building to cost approximately $50,000, for company motor trucks and cars.

Fire, June 27, destroyed a portion of the two-story plant of the New England Go-Cart Co., Gardner Road, East Templeton, Mass., with loss reported at close to $16,000 including equipment. Plans for rebuilding are said to be under consideration.

The Standard Oil Co., North Adams, Mass., has plans for extensions and improvements in its storage and distributing plant estimated to cost close to $50,000. The work will include the installation of additional tanks and auxiliary equipment, as well as a one-story automobile garage and service building.

The Royal Typewriter Co., Hartford, Conn., has taken out a permit for the construction of a proposed two-story addition to its plant at 150 New Park Avenue, to cost $52,000. Headquarters are at 316 Broadway, New York.

C. A. Cotton, 135 High Street, Boston, has been appointed district sales agent in the New England territory for the Burke Electric Co., Erie, Pa., manufacturer of alternating and direct current motors, synchronous motors, generators and electric arc welding equipment.

The Colwell Cigar Machine Corporation has been incorporated and has succeeded the Colwell Cigar Machine Co., 131 Washington Street, Providence, R. I. There will be no important changes in the business, which is that of manufacturing cigar-making machinery. A. J. Colwell is vice-president.

Canada

TORONTO, July 4.

INQUIRIES for machine tools are increasing and sales are holding up well. The automotive industry is now furnishing a fairly good demand, while inquiries are also appearing for machine shop and foundry equipment. Much of the present business is for new tools of late design, but agencies handling rebuilt and used machines report improved demand for those lines. Sales for the month of June show some improvement over those for May and were much better than for the corresponding month last year. Sentiment is more optimistic than it has been for some time and the general belief is that a steady demand will continue throughout the remainder of the year.

J. Lefelore, Rigaud, Que., is building a foundry and is asking for prices on general foundry equipment.

The Niagara Falls, Ont., Hydro Electric Commission plans extensions to a local power plant on Victoria Avenue. Superintendent Teckoe is in charge.

Cutting Risers with Illuminating Gas

Illuminating gas for metal cutting has been adopted at the Schenectady plant of the General Electric Co. A special oxy-illuminating gas torch was developed for the purpose, and is now being used for the cutting of risers in the steel foundry of that plant, varying in thickness from 1 to 20 in.

I. Morin, Ste. Claire, Que., is in the market for a drill press, shaper and other tools for a machine shop.

Pierre Pepin, St. Evariste Station, Que., is in the market for lathes, shapers and general foundry equipment.

The Montreal Rail & Harbor Terminals, Ltd., Montreal, a Canadian Pacific Railway subsidiary, proposes to build a cold storage plant and terminal warehouse on Craig Street, at a cost of $5,000,000.

It is stated that interests close to the National Cement Co., Montreal and Credit Canada, Ltd., have secured an option on limestone property at Toronto and have plans underway for the formation of a company to take over the property, and build a Portland cement plant.

The plant owned by the Caledonia Pulp Mills, Caledonia, N. S., was destroyed by fire recently with a loss of $75,000.

The plant of the National Castings, Ltd., George Street South, Belleville, Ont., was totally destroyed by fire June 27 with loss to building and equipment estimated at $50,000. It is expected that the owners will rebuild.

The repair shop of the Canadian National Railways at Joliette, Que., was destroyed by fire with loss to building and machinery of $75,000.

The plant of the Leaside Sand & Brick Co., Leaside, Ont., was recently destroyed by fire with a loss of $100,000. It is expected that rebuilding will be started at once.

The Thunder Bay Pulp & Paper Co., Ltd., Port Arthur, Ont., has started work on the erection of a $500,000 paper mill at Bear Point. M. Cutell is engineer.

The Bourassa & Clifford Corporation, Ltd., 35 St. Antoine Street, Three Rivers, Que., has been awarded general contract for the erection of a $75,000 manufacturing plant at Cap de la Madeleine, Que., for the Bates Valve Bag Co., Ltd., 8200 South Chicago Avenue, Chicago.

Engineers are preparing plans for car shops to be erected at the corner of King Street and Sanford Avenue, Hamilton, Ont., to cost $300,000, for the Dominion Power & Transmission Co.

The Cedar Lake Lumber Co., which recently acquired the building of the Burrill-Johnson Iron Co., at Yarmouth, N. S., is putting the plant in shape for manufacturing operations. The building formerly used as a machine shop is being cleared and machinery will be installed for the semi-manufacture of hardwood squares.

The Swanson Building Units, Ltd., has acquired the building formerly occupied by McPhail & Wright, Sault Ste. Marie, Ont., and will immediately install equipment for the manufacture of building blocks and interlocking cement and wooden blocks.

Western Canada

The Pacific Bolt & Nut Co., Vancouver, B. C., has purchased the plant of the Schaake Engineering Works, adjacent to its property on Industrial Island. The prospect of supplying bolts, nuts, rivets and spikes for Canadian railroads in western Canada, and increased business generally has made this expansion necessary. The construction of a wharf and the installation of up-to-date steel handling facilities will be undertaken immediately. While the new plant will be operated for a time on lines manufactured heretofore it is the intention to make arrangements with other engineering firms to take over the manufacture of sawmill, shingle mill, drag saw, gas engine and other equipment previously turned out by the Schaake plant.

In anticipation of the completion of the new Government drydock at Esquimalt, B. C., Yarrows, Ltd., Victoria, B. C., is preparing to build a ship repair plant next to the graving basin, to be constructed in units.

The sawmill at Merritt, B. C., of the Nicola Pine Lumber Co., was recently destroyed by fire with a loss of $200,000.

MORE IRON ORE MINED

1925 Shows 14 Per Cent Increase Over 1924 Total

Figures prepared by the United States Bureau of Mines show a 1925 production of iron ore of 61,907,997 gross tons and shipments amounting to 63,924,763 tons. The shipments were valued at $161,796,886, or an average of $2.52 per ton at the mines. This is 39c. less than in 1924. Stocks of ore at the mines at the end of 1925 were 10,795,630 tons, a drop of 13 per cent from the 12,410,619 tons of the preceding year.

Production of the mines by States is shown in the table, together with the percentage of increase or decrease in 1925, compared with 1924.

Iron Ore Mined in the United States in 1924 and 1925, in Gross Tons

(Exclusive of ore containing 5 per cent or more of manganese)

State	1924	1925	Percentage of Increase or Decrease in 1925
Alabama	6,993,613	7,093,250	+ 1½
California	435	352	— 19
Colorado	4,702	8,642	+ 84
Georgia	113,039	78,835	— 30
Michigan	12,350,755	14,490,529	+ 17
Minnesota	31,902,085	36,856,244	+ 16
Missouri	79,847	40,043	— 50
Montana	3,913	3,672	— 6
New Jersey	65,197	202,942	+211
New Mexico	189,371	172,959	— 9
New York	255,832	141,534	— 45
North Carolina	12,525	22,011	+ 76
Ohio	244	2,410	+888
Pennsylvania	807,208	955,955	+ 18
Tennessee	179,853	164,717	— 8
Utah	164,154	270,029	+ 64
Virginia	89,792	96,272	+ 7
Washington	1,700	830	— 51
Wisconsin	690,058	817,149	+ 18
Wyoming	363,096	489,622	+ 35
Total	54,267,419	61,907,997	+ 14

High Output of Steel Barrels

Production of steel barrels in May is reported by the Department of Commerce at 581,962, the lowest number since February, but higher than in any previous month since April, 1925. The May total, which is from 31 establishments, compares with 602,058 in April and with 570,962 in May, 1925. Shipments held close to production. Stocks on May 31 were 44,021. Unfilled orders were for 417,718 to be shipped within 30 days and 792,097 on longer time, a decrease of about 80,000, in the latter category, since April 30.

Business of the members of the Steel Barrel Manufacturers' Institute was reported at $1,435,869 in May. Shipments were 431,452 units, of which only one was for export (to Niagara Falls, Ont.). Capacity for I.C.C. barrels was utilized, during the month, to 26.9 per cent; for light barrels, to 57.1 per cent; for all barrels, to 51.3 per cent.

New Jersey took more than one-fourth of the product; Pennsylvania, New York, Texas, Illinois and Indiana followed, in that order.

Copper Used by Public Utilities

Public utility use of copper in 1925 is estimated as 110,000 net tons, of which 89,118 tons was for additions and 20,882 tons for replacements, according to the American Bureau of Metal Statistics. Old copper taken down is given at 17,500 tons. Of the total installations, wire accounts for 107,360 tons, and

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bus bars for 2640 tons, and of the old copper, wire accounts for 17,290 tons and bus bars for 210 tons.

In all particulars the 1925 figures form a new record, having been approximately 25 per cent above the 90,000-ton installation figure and 14,000 tons of old copper in 1900. In 1923, installations aggregated 85,850 tons, but in no other year since the war has the figure reached 50,000 tons. Only in 1924 and 1925 has the old copper figure passed 8000 tons. The figures are estimates based on reports from companies which produced by far the major portion of the total electric output in the last few years.

By-Product Coke Production Steady

WASHINGTON, July 2.—The total by-product coke output for May was 3,722,000 net tons and that for April was 3,602,000 tons, according to the Bureau of Mines. The apparent increase of 120,000 tons, or 3 per cent, is due to the extra day in May. Average daily production was the same in the two months, 120,000 tons. The plants operated at about 88 per cent of capacity. However, of the 81 plants now in existence, only 74 were active in May, one less than in April.

Output of all coke was 4,606,000 net tons, the by-product plants producing 81 per cent and the beehive ovens 19 per cent. Of the total output of by-product coke during May, 3,076,000 tons, or 82.6 per cent, was made in plants associated with iron furnaces and 646,000 tons, or 17.4 per cent, was made at merchant or other plants.

46,000,000 Gainfully Employed

"Progress in Waste Elimination" is the title of a pamphlet issued by the Policyholders' Service Bureau, Metropolitan Life Insurance Co., New York, which features an estimate of the number of persons in the United States who are gainfully occupied. With a total population of 116,000,000, it is estimated that 46,000,000 are engaged in remunerative work, divided roughly as follows:

	Number	Percentage
Manufacturing and mechanical pursuit	14,300,000	31.0
Agricultural	12,200,000	26.5
Trade	4,600,000	10.0
Domestic and personal service	3,700,000	8.0
Clerical work	3,400,000	7.5
Transportation	3,400,000	7.5
Professional service	2,300,000	5.0
Mining	1,200,000	2.5
All other	900,000	2.0
Gainfully occupied	46,000,000	100.0

Galvanized Sheet-Metal Ware

WASHINGTON, July 2.—April production of galvanized sheet-metal ware, as reported by 12 concerns comprising a large proportion of the industry, was 136,141 dozens, valued at $490,992, as compared with 180,573 dozens, valued at $635,897, in March. This summary inaugurates a new compilation by the Department of Commerce which will be issued monthly in the future. The galvanized ware included in this summary is the product resulting from dipping made-up shapes in molten zinc, and not utensils of galvanized sheets.

Pails, buckets and tubs, steel baskets, ash and garbage cans and covers, coal hods, feed and dry measures, refrigerator pans, watering pots and oil and gasoline cans are typical examples of the products covered.

Reports on Elimination of Waste

Simplified Practice Pamphlets Nos. 28, 47 and 49, issued by the Bureau of Standards, Washington, deal respectively with sheet steel, cut tacks and small cut nails, and sidewalk, floor and roof lights. Copies of these pamphlets may be obtained at 5c. each from the Superintendent of Documents, Government Printing Office, Washington. Specifications are given of the approved standards, subject to periodical revision, as may be needed.

THE LAST WORD

(Contributed by the Reader Service Department of the Iron Age Publishing Co.)

A LUMBER paper announces gleefully that engineers have discovered a substitute for iron, but discreetly gives no particulars. So wait for further news before tearing down the blast furnaces.

Every time I read of a new "substitute" for gasoline there flashes before me a mental picture of John D. Rockefeller, forced by poverty to plow up the greens on his private golf course and plant vegetables.

THE other day a steel manufacturer commented to me on the comparative youth of some of the men whose decease was reported in THE IRON AGE obituary columns. But an analysis of the deaths reported in the past six months reveals that the majority of men in the industry live past 60 years, as shown in this table:

Age at time of death	
20 to 29 years	1
30 to 39 years	3
40 to 49 years	19
50 to 59 years	31
60 to 69 years	34
70 to 79 years	30
80 to 89 years	8
90 to 100 years	4
Total	130

Fifty-eight per cent lived past 60 years, and the average length of life was 63 years.

IN passing through the editorial sanctum the other day I noticed that the finishing touches are being put on the index of THE IRON AGE volume just completed, No. 117, which includes all issues from Jan. 7 to June 24, 1926. If you want a copy of the index when it comes off the press, drop a line to Miss G. R. Stone, THE IRON AGE, 239 West Thirty-ninth Street, New York. No charge, of course.

EVERYONE who sells his goods at less than a fair profit is a price-cutter. Who profits by the losses of the price-cutter? "The public," says Waterman, the fountain pen man.

"But does it?" questions Joseph A. Richards, New York, in an arresting article in the June *Advertising and Selling*. Mr. Richards, who has devoted many years to the development of successful methods of marketing, makes the point that the public is the eventual loser by price-cutting, for the manufacturer who consistently sells at less than a fair profit inevitably fails, shutting off what may have been a dependable source of supply.

From THE IRON AGE front cover editorial of Jan. 7, entitled "Wanted—A Fair Profit," Mr. Richards quotes this sentence, "*The steel business needs one good year*," and adds:

> Now, my contention is that if the steel business needs such a year, in all honesty and fairness the public needs to have the steel business enjoy one good year—a year of fair and legitimate profit.

A. H. D.